UAG4100

Unified Access Gateway

Version 4.00
Edition 1, 07/2013

User's Guide

Default Login Details	
LAN IP Address	http://172.16.0.1 (LAN1) http://172.17.0.1 (LAN2)
User Name	admin
Password	1234

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IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

Screenshots and graphics in this book may differ slightly from your product due to differences in your product firmware or your computer operating system. Every effort has been made to ensure that the information in this manual is accurate.

Related Documentation

- Quick Start Guide

  The Quick Start Guide shows how to connect the UAG and access the Web Configurator wizards. (See the wizard real time help for information on configuring each screen.) It also contains a package contents list.

- CLI Reference Guide

  The CLI Reference Guide explains how to use the Command-Line Interface (CLI) to configure the UAG.

Note: It is recommended you use the Web Configurator to configure the UAG.

- Web Configurator Online Help

  Click the help icon in any screen for help in configuring that screen and supplementary information.

Contents Overview

Introduction 17
Hardware Installation and Connection 31
Installation Setup Wizard 35
Quick Setup Wizards 43
Dashboard 49
Monitor 59
Registration 90
Wireless 93
Interfaces 97
Trunks 137
Policy and Static Routes 145
Zones 155
DDNS 159
NAT 164
VPN 1-1 Mapping 171
HTTP Redirect 176
SMTP Redirect 180
ALG 184
UPnP 186
IP/MAC Binding 193
Layer 2 Isolation 198
IPnP 202
Web Authentication 204
Firewall 223
Billing 237
Printer Manager 252
Free Time 259
SMS 263
Bandwidth Management 265
User/Group 275
AP Profile 289
Addresses 304
Services 309
Schedules 314
AAA Server 318
Authentication Method 322
Certificates 325
ISP Accounts 341
System 344

Log and Report 385
File Manager 400
Diagnostics 411
Packet Flow Explore 419
Reboot 427
Shutdown 428
Troubleshooting 429

Table of Contents

Contents Overview **3**

Table of Contents **5**

Chapter 1
Introduction **17**

1.1 Overview 17
1.2 Default Zones, Interfaces, and Ports 17
1.3 Management Overview 18
1.4 Web Configurator 19
1.4.1 Web Configurator Access 19
1.4.2 Web Configurator Screens Overview 20
1.4.3 Navigation Panel 23
1.4.4 Tables and Lists 27
1.5 Stopping the UAG 30

Chapter 2
Hardware Installation and Connection **31**

2.1 Wall Mounting 31
2.2 Front Panel 32
2.2.1 Front Panel LEDs 33
2.3 Rear Panel 34

Chapter 3
Installation Setup Wizard **35**

3.1 Installation Setup Wizard Screens 35
3.1.1 Internet Access Setup - WAN Interface 35
3.1.2 Internet Access: Ethernet 36
3.1.3 Internet Access: PPPoE 37
3.1.4 Internet Access: PPTP 39
3.1.5 ISP Parameters 39
3.1.6 Internet Access - Finish 40
3.2 Device Registration 41

Chapter 4
Quick Setup Wizards **43**

4.1 Quick Setup Overview 43
4.2 WAN Interface Quick Setup 43
4.2.1 Choose an Ethernet Interface 44
4.2.2 Select WAN Type 44

4.2.3 Configure WAN Settings 45
4.2.4 WAN and ISP Connection Settings 45
4.2.5 Quick Setup Interface Wizard: Summary 47

Chapter 5
Dashboard 49

5.1 Overview 49
5.1.1 What You Can Do in this Chapter 49
5.2 The Dashboard Screen 49
5.2.1 The CPU Usage Screen 54
5.2.2 The Memory Usage Screen 55
5.2.3 The Active Sessions Screen 55
5.2.4 The DHCP Table Screen 56
5.2.5 The Number of Login Users Screen 57

Chapter 6
Monitor 59

6.1 Overview 59
6.1.1 What You Can Do in this Chapter 59
6.2 The Port Statistics Screen 60
6.2.1 The Port Statistics Graph Screen 61
6.3 The Interface Status Screen 62
6.4 The Traffic Statistics Screen 64
6.5 The Session Monitor Screen 66
6.6 The DDNS Status Screen 68
6.7 The IP/MAC Binding Monitor Screen 69
6.8 The Login Users Screen 70
6.9 The UPnP Port Status Screen 71
6.10 The USB Storage Screen 72
6.11 The Dynamic Guest Screen 73
6.12 The AP List Screen 75
6.12.1 Station Count of AP 76
6.13 The Radio List Screen 77
6.13.1 AP Mode Radio Information 79
6.14 The Station List Screen 80
6.15 The Printer Status Screen 81
6.16 The VPN 1-1 Mapping Status Screen 82
6.16.1 VPN 1-1 Mapping Statistics 83
6.17 The Log Screen 83
6.17.1 View AP Log 86
6.17.2 Dynamic Users Log 88

Chapter 7
Registration 90

7.1 Overview 90
7.1.1 What You Can Do in this Chapter 90
7.1.2 What you Need to Know 90
7.2 Registration Screen 91
7.3 Service Screen 91

Chapter 8
Wireless 93

8.1 Overview 93
8.1.1 What You Can Do in this Chapter 93
8.2 Controller Screen 93
8.3 AP Management Screen 94
8.3.1 Edit AP List 95

Chapter 9
Interfaces 97

9.1 Interface Overview 97
9.1.1 What You Can Do in this Chapter 97
9.1.2 What You Need to Know 97
9.2 Port Role Screen 99
9.3 Ethernet Summary Screen 100
9.3.1 Ethernet Edit 102
9.3.2 Object References 108
9.3.3 Add/Edit DHCP Extended Options 109
9.4 PPP Interfaces 111
9.4.1 PPP Interface Summary 111
9.4.2 PPP Interface Add or Edit 113
9.5 VLAN Interfaces 117
9.5.1 VLAN Interface Summary Screen 118
9.5.2 VLAN Interface Add/Edit 119
9.6 Bridge Interfaces 124
9.6.1 Bridge Interface Summary 126
9.6.2 Bridge Interface Add/Edit 127
9.7 Virtual Interfaces 131
9.7.1 Virtual Interfaces Add/Edit 132
9.8 Interface Technical Reference 133

Chapter 10
Trunks 137

10.1 Overview 137
10.1.1 What You Can Do in this Chapter 137
10.1.2 What You Need to Know 137
10.2 The Trunk Summary Screen 140

10.2.1 Configuring a User-Defined Trunk 141
10.2.2 Configuring the System Default Trunk 143

Chapter 11
Policy and Static Routes 145

11.1 Policy and Static Routes Overview 145
11.1.1 What You Can Do in this Chapter 145
11.1.2 What You Need to Know 145
11.2 Policy Route Screen 147
11.2.1 Policy Route Edit Screen 149
11.3 IP Static Route Screen 152
11.3.1 Static Route Add/Edit Screen 153
11.4 Policy Routing Technical Reference 154

Chapter 12
Zones 155

12.1 Zones Overview 155
12.1.1 What You Can Do in this Chapter 155
12.1.2 What You Need to Know 155
12.2 The Zone Screen 156
12.2.1 Zone Edit 157

Chapter 13
DDNS 159

13.1 DDNS Overview 159
13.1.1 What You Can Do in this Chapter 159
13.1.2 What You Need to Know 159
13.2 The DDNS Screen 160
13.2.1 The Dynamic DNS Add/Edit Screen 161

Chapter 14
NAT 164

14.1 NAT Overview 164
14.1.1 What You Can Do in this Chapter 164
14.1.2 What You Need to Know 164
14.2 The NAT Screen 165
14.2.1 The NAT Add/Edit Screen 166
14.3 NAT Technical Reference 169

Chapter 15
VPN 1-1 Mapping 171

15.1 VPN 1-1 Mapping Overview 171
15.1.1 What You Can Do in this Chapter 171

15.1.2 What You Need to Know 171
15.2 The VPN 1-1 Mapping General Screen 172
15.2.1 The VPN 1-1 Mapping Edit Screen 173
15.3 The VPN 1-1 Mapping Profile Screen 174

Chapter 16
HTTP Redirect 176

16.1 Overview 176
16.1.1 What You Can Do in this Chapter 176
16.1.2 What You Need to Know 176
16.2 The HTTP Redirect Screen 177
16.2.1 The HTTP Redirect Edit Screen 178

Chapter 17
SMTP Redirect 180

17.1 Overview 180
17.1.1 What You Can Do in this Chapter 180
17.1.2 What You Need to Know 180
17.2 The SMTP Redirect Screen 181
17.2.1 The SMTP Redirect Edit Screen 182

Chapter 18
ALG 184

18.1 ALG Overview 184
18.1.1 What You Can Do in this Chapter 184
18.1.2 What You Need to Know 184
18.1.3 Before You Begin 185
18.2 The ALG Screen 185

Chapter 19
UPnP 186

19.1 Overview 186
19.2 What You Need to Know 186
19.2.1 NAT Traversal 186
19.2.2 Cautions with UPnP 187
19.3 UPnP Screen 187
19.4 Technical Reference 188
19.4.1 Using UPnP in Windows XP Example 188
19.4.2 Web Configurator Easy Access 190

Chapter 20
IP/MAC Binding 193

20.1 IP/MAC Binding Overview 193

20.1.1 What You Can Do in this Chapter 193
20.1.2 What You Need to Know 193
20.2 IP/MAC Binding Summary 194
20.2.1 IP/MAC Binding Edit 194
20.2.2 Static DHCP Edit 196
20.3 IP/MAC Binding Exempt List 196

Chapter 21
Layer 2 Isolation 198

21.1 Overview 198
21.1.1 What You Can Do in this Chapter 198
21.2 Layer-2 Isolation General Screen 199
21.3 White List 199
21.3.1 Add/Edit White List Rule 200

Chapter 22
IPnP 202

22.1 Overview 202
22.1.1 What You Can Do in this Chapter 202
22.2 IPnP Screen 203

Chapter 23
Web Authentication 204

23.1 Overview 204
23.1.1 What You Can Do in this Chapter 204
23.1.2 What You Need to Know 205
23.2 Web Authentication Screen 205
23.2.1 Creating/Editing an Authentication Policy 211
23.2.2 User-aware Access Control Example 212
23.3 Walled Garden Screen 218
23.3.1 Adding/Editing a Walled Garden URL 219
23.3.2 Walled Garden Login Example 219
23.4 Advertisement Screen 220
23.4.1 Adding/Editing an Advertisement URL 221

Chapter 24
Firewall 223

24.1 Overview 223
24.1.1 What You Can Do in this Chapter 223
24.1.2 What You Need to Know 223
24.2 The Firewall Screen 225
24.2.1 Configuring the Firewall Screen 226
24.2.2 The Firewall Add/Edit Screen 228

24.3 The Session Control Screen 230
24.3.1 The Session Limit Add/Edit Screen 231
24.4 Firewall Rule Configuration Example 232
24.5 Firewall Rule Example Applications 234

Chapter 25
Billing 237

25.1 Overview 237
25.1.1 What You Can Do in this Chapter 237
25.1.2 What You Need to Know 237
25.2 The General Screen 238
25.3 The Billing Profile Screen 239
25.3.1 The Account Generator Screen 241
25.3.2 The Account Redeem Screen 243
25.3.3 The Billing Profile Add/Edit Screen 245
25.4 The Discount Screen 245
25.4.1 The Discount Add/Edit Screen 247
25.5 The Payment Service General Screen 247
25.5.1 The Payment Service Custom Service Screen 249

Chapter 26
Printer Manager 252

26.1 Overview 252
26.1.1 What You Can Do in this Chapter 252
26.2 The General Screen 252
26.3 The Printout Configuration Screen 254
26.3.1 Reports Overview 255
26.3.2 Key Combinations 255
26.3.3 Daily Account Summary 256
26.3.4 Monthly Account Summary 256
26.3.5 Account Report Notes 257
26.3.6 System Status 257

Chapter 27
Free Time 259

27.1 Overview 259
27.1.1 What You Can Do in this Chapter 259
27.2 The Free Time Screen 259

Chapter 28
SMS 263

28.1 Overview 263
28.1.1 What You Can Do in this Chapter 263

28.2 The SMS Screen 263

Chapter 29
Bandwidth Management 265

29.1 Overview 265
29.1.1 What You Can Do in this Chapter 265
29.1.2 What You Need to Know 265
29.2 The Bandwidth Management Screen 269
29.2.1 The Bandwidth Management Add/Edit Screen 271

Chapter 30
User/Group 275

30.1 Overview 275
30.1.1 What You Can Do in this Chapter 275
30.1.2 What You Need To Know 275
30.2 User Summary Screen 277
30.2.1 User Add/Edit Screen 278
30.3 User Group Summary Screen 281
30.3.1 Group Add/Edit Screen 281
30.4 The User/Group Setting Screen 282
30.4.1 Default User Settings Edit Screens 285
30.4.2 User Aware Login Example 286
30.5 User /Group Technical Reference 287

Chapter 31
AP Profile 289

31.1 Overview 289
31.1.1 What You Can Do in this Chapter 289
31.1.2 What You Need To Know 289
31.2 Radio Screen 290
31.2.1 Add/Edit Radio Profile 292
31.3 SSID Screen 295
31.3.1 SSID List 295
31.3.2 Add/Edit SSID Profile 297
31.3.3 Security List 298
31.3.4 Add/Edit Security Profile 300
31.3.5 MAC Filter List 302
31.3.6 Add/Edit MAC Filter Profile 303

Chapter 32
Addresses 304

32.1 Overview 304
32.1.1 What You Can Do in this Chapter 304

32.1.2 What You Need To Know 304
32.2 Address Summary Screen 304
32.2.1 Address Add/Edit Screen 305
32.3 Address Group Summary Screen 306
32.3.1 Address Group Add/Edit Screen 307

Chapter 33
Services 309

33.1 Overview 309
33.1.1 What You Can Do in this Chapter 309
33.1.2 What You Need to Know 309
33.2 The Service Summary Screen 310
33.2.1 The Service Add/Edit Screen 311
33.3 The Service Group Summary Screen 312
33.3.1 The Service Group Add/Edit Screen 312

Chapter 34
Schedules 314

34.1 Overview 314
34.1.1 What You Can Do in this Chapter 314
34.1.2 What You Need to Know 314
34.2 The Schedule Summary Screen 315
34.2.1 The One-Time Schedule Add/Edit Screen 316
34.2.2 The Recurring Schedule Add/Edit Screen 317

Chapter 35
AAA Server 318

35.1 Overview 318
35.1.1 RADIUS Server 318
35.1.2 What You Can Do in this Chapter 318
35.1.3 What You Need To Know 318
35.2 RADIUS Server Summary 319
35.2.1 Adding a RADIUS Server 319

Chapter 36
Authentication Method 322

36.1 Overview 322
36.1.1 What You Can Do in this Chapter 322
36.1.2 Before You Begin 322
36.2 Authentication Method Objects 322
36.2.1 Creating an Authentication Method Object 323

Chapter 37
Certificates 325

37.1 Overview 325
37.1.1 What You Can Do in this Chapter 325
37.1.2 What You Need to Know 325
37.1.3 Verifying a Certificate 327
37.2 The My Certificates Screen 328
37.2.1 The My Certificates Add Screen 329
37.2.2 The My Certificates Edit Screen 331
37.2.3 The My Certificates Import Screen 334
37.3 The Trusted Certificates Screen 335
37.3.1 The Trusted Certificates Edit Screen 336
37.3.2 The Trusted Certificates Import Screen 339

Chapter 38
ISP Accounts 341

38.1 Overview 341
38.1.1 What You Can Do in this Chapter 341
38.2 ISP Account Summary 341
38.2.1 ISP Account Edit 342

Chapter 39
System 344

39.1 Overview 344
39.1.1 What You Can Do in this Chapter 344
39.2 Host Name 345
39.3 USB Storage 345
39.4 Date and Time 346
39.4.1 Pre-defined NTP Time Servers List 349
39.4.2 Time Server Synchronization 349
39.5 Console Port Speed 350
39.6 DNS Overview 351
39.6.1 DNS Server Address Assignment 351
39.6.2 Configuring the DNS Screen 351
39.6.3 Address Record 353
39.6.4 PTR Record 353
39.6.5 Adding an Address/PTR Record 353
39.6.6 Domain Zone Forwarder 354
39.6.7 Adding a Domain Zone Forwarder 354
39.6.8 MX Record 355
39.6.9 Adding a MX Record 355
39.6.10 Adding a DNS Service Control Rule 356
39.7 WWW Overview 357
39.7.1 Service Access Limitations 357
39.7.2 System Timeout 357

39.7.3 HTTPS 357
39.7.4 Configuring WWW Service Control 358
39.7.5 Service Control Rules 361
39.7.6 Customizing the WWW Login Page 362
39.7.7 HTTPS Example 366
39.8 SSH 373
39.8.1 How SSH Works 374
39.8.2 SSH Implementation on the UAG 375
39.8.3 Requirements for Using SSH 375
39.8.4 Configuring SSH 375
39.8.5 Secure Telnet Using SSH Examples 376
39.9 Telnet 378
39.9.1 Configuring Telnet 378
39.10 FTP 379
39.10.1 Configuring FTP 379
39.11 SNMP 380
39.11.1 Supported MIBs 381
39.11.2 SNMP Traps 382
39.11.3 Configuring SNMP 382
39.12 Language 384

Chapter 40
Log and Report 385

40.1 Overview 385
40.1.1 What You Can Do In this Chapter 385
40.2 Email Daily Report 385
40.3 Log Settings Screens 387
40.3.1 Log Settings Summary 388
40.3.2 Edit System Log Settings 389
40.3.3 Edit Log on USB Storage Setting 392
40.3.4 Edit Remote Server Log Settings 394
40.3.5 Log Category Settings Screen 396

Chapter 41
File Manager 400

41.1 Overview 400
41.1.1 What You Can Do in this Chapter 400
41.1.2 What you Need to Know 400
41.2 The Configuration File Screen 402
41.3 The Firmware Package Screen 406
41.4 The Shell Script Screen 408

Chapter 42
Diagnostics 411

42.1 Overview 411
42.1.1 What You Can Do in this Chapter 411
42.2 The Diagnostics Screen 411
42.2.1 The Diagnostics Files Screen 412
42.3 The Packet Capture Screen 413
42.3.1 The Packet Capture Files Screen 415
42.4 Core Dump Screen 416
42.4.1 Core Dump Files Screen 417
42.5 The System Log Screen 417

Chapter 43
Packet Flow Explore 419

43.1 Overview 419
43.1.1 What You Can Do in this Chapter 419
43.2 The Routing Status Screen 419
43.3 The SNAT Status Screen 423

Chapter 44
Reboot 427

44.1 Overview 427
44.1.1 What You Need To Know 427
44.2 The Reboot Screen 427

Chapter 45
Shutdown 428

45.1 Overview 428
45.1.1 What You Need To Know 428
45.2 The Shutdown Screen 428

Chapter 46
Troubleshooting 429

46.1 Resetting the UAG 435
46.2 Getting More Troubleshooting Help 436

Appendix A Legal Information 437

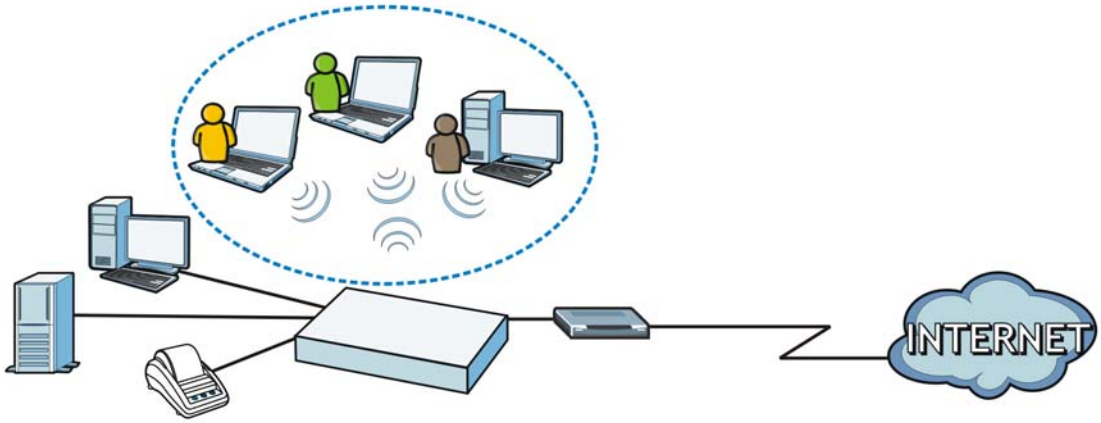
Index 440

1

Introduction

1.1 Overview

The UAG is a comprehensive service gateway. The UAG combines an IEEE 802.11n wireless access point, router, 4-port switch and service gateway in one box. If you have a "statement printer", such as SP350E, you can connect it directly to the UAG, allowing you to easily print subscriber statements. The UAG is ideal for offices, coffee shops, libraries, hotels and airport terminals catering to subscribers that seek Internet access. You should have an Internet account already set up and have been given usernames, passwords etc. required for Internet access.



You can use web authentication to allow guests to access the network only after they authenticate with the UAG through a specifically designated login web page. You can also forward the authenticated client's e-mail messages to a specific SMTP server.

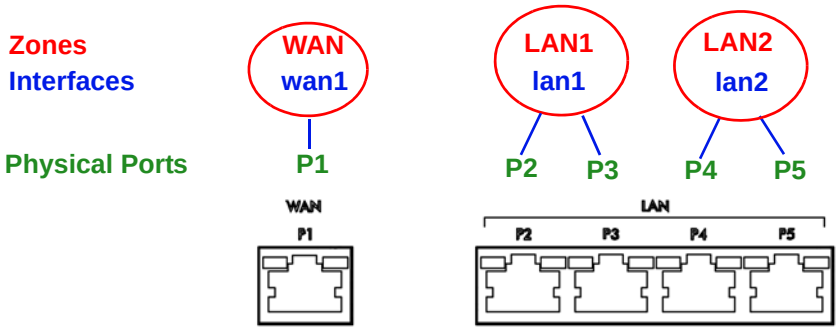
The UAG also provides bandwidth management, NAT, port forwarding, policy routing, DHCP server and many other powerful features. The UAG's security features include firewall and certificates.

The UAG lets you set up multiple networks for your company. The UAG also provides two separate LAN networks. You can set ports to be part of the LAN1 or LAN2. Alternatively, you can deploy the UAG as a transparent firewall in an existing network with minimal configuration.

1.2 Default Zones, Interfaces, and Ports

The default configurations for zones, interfaces, and ports are as follows. References to interfaces may be generic rather than the specific name used in your model. For example, this guide may use "the WAN interface" rather than "P1".

Figure 1 Zones, Interfaces, and Physical Ethernet Ports



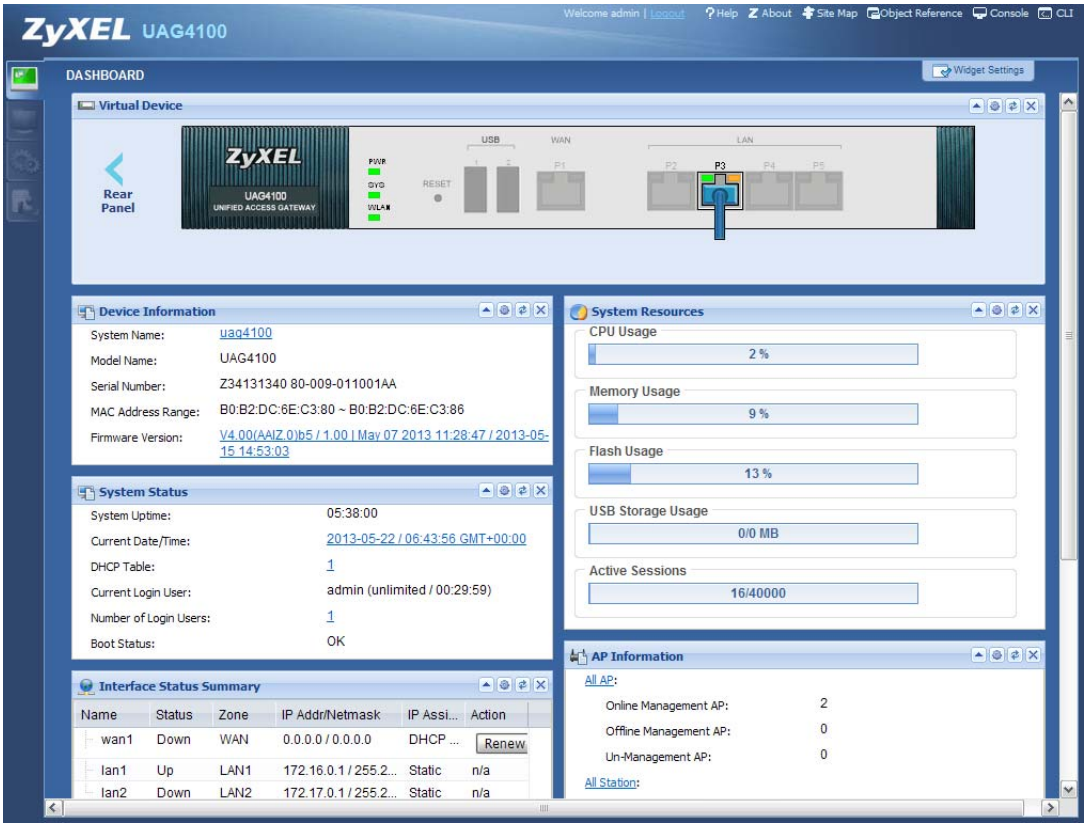
1.3 Management Overview

You can manage the UAG in the following ways.

Web Configurator

The Web Configurator allows easy UAG setup and management using an Internet browser. This User's Guide provides information about the Web Configurator.

Figure 2 Managing the UAG: Web Configurator



Command-Line Interface (CLI)

The CLI allows you to use text-based commands to configure the UAG. Access it using remote management (for example, SSH or Telnet) or via the physical or Web Configurator console port. See the Command Reference Guide for CLI details. The default settings for the console port are:

Table 1 Console Port Default Settings

SETTING	VALUE
Speed	115200 bps
Data Bits	8
Parity	None
Stop Bit	1
Flow Control	Off

1.4 Web Configurator

In order to use the Web Configurator, you must:

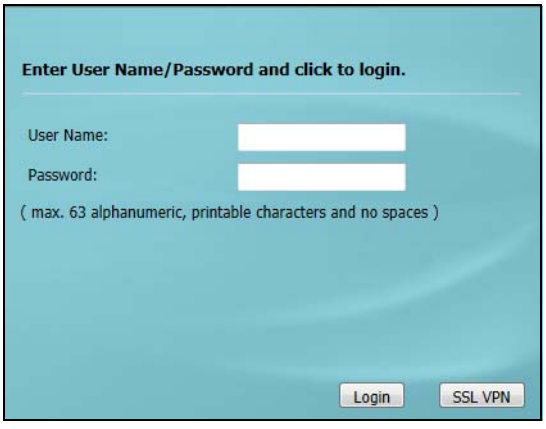
- Use one of the following web browser versions or later: Internet Explorer 6.0, Firefox 8.0, Chrome 14.0, Safari 4.0
- Allow pop-up windows (blocked by default in Windows XP Service Pack 2)
- Enable JavaScripts, Java permissions, and cookies

The recommended screen resolution is 1024 x 768 pixels.

1.4.1 Web Configurator Access

1 Make sure your UAG hardware is properly connected. See the Quick Start Guide.

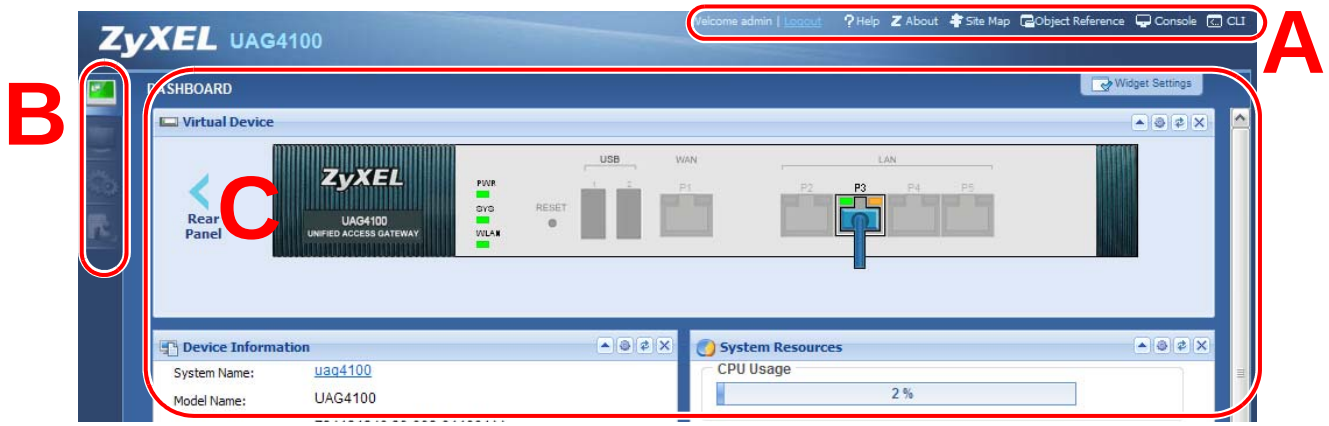
2 In your browser go to http://172.16.0.1 or http://172.17.0.1. By default, the UAG automatically routes this request to its HTTPS server, and it is recommended to keep this setting. The **Login** screen appears.



3 Type the user name (default: “admin”) and password (default: “1234”).

4 Click **Login**. If you logged in using the default user name and password, the **Update Admin Info** screen appears. Otherwise, the dashboard appears.

5 Follow the directions in the **Update Admin Info** screen. If you change the default password, the **Login** screen appears after you click **Apply**. If you click **Ignore**, the **Installation Setup Wizard** opens if the UAG is using its default configuration; otherwise the dashboard appears.



1.4.2 Web Configurator Screens Overview

The Web Configurator screen is divided into these parts (as illustrated on page 20):

- **A** - title bar
- **B** - navigation panel
- **C** - main window

1.4.2.1 Title Bar

Figure 3 Title Bar

The title bar icons in the upper right corner provide the following functions.

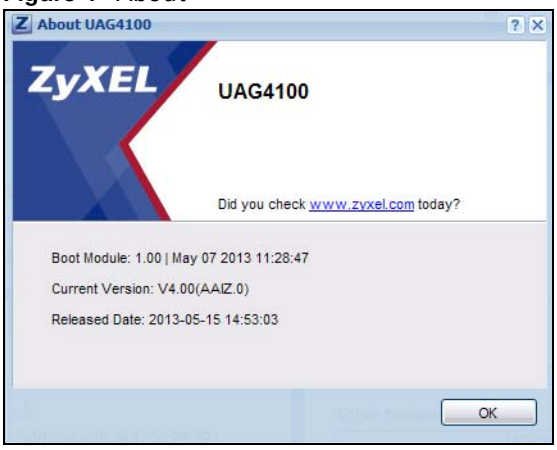
Table 2 Title Bar: Web Configurator Icons

LABEL	DESCRIPTION
Logout	Click this to log out of the Web Configurator.
Help	Click this to open the help page for the current screen.
About	Click this to display basic information about the UAG.
Site Map	Click this to see an overview of links to the Web Configurator screens.
Object Reference	Click this to check which configuration items reference an object.
Console	Click this to open a Java-based console window from which you can run command line interface (CLI) commands. You will be prompted to enter your user name and password. See the Command Reference Guide for information about the commands.
CLI	Click this to open a popup window that displays the CLI commands sent by the Web Configurator to the UAG.

About

Click **About** to display basic information about the UAG.

Figure 4 About



The following table describes labels that can appear in this screen.

Table 3 About

LABEL	DESCRIPTION
Boot Module	This shows the version number of the software that handles the booting process of the UAG.
Current Version	This shows the firmware version of the UAG.
Released Date	This shows the date (yyyy-mm-dd) and time (hh:mm:ss) when the firmware is released.
OK	Click this to close the screen.

Site Map

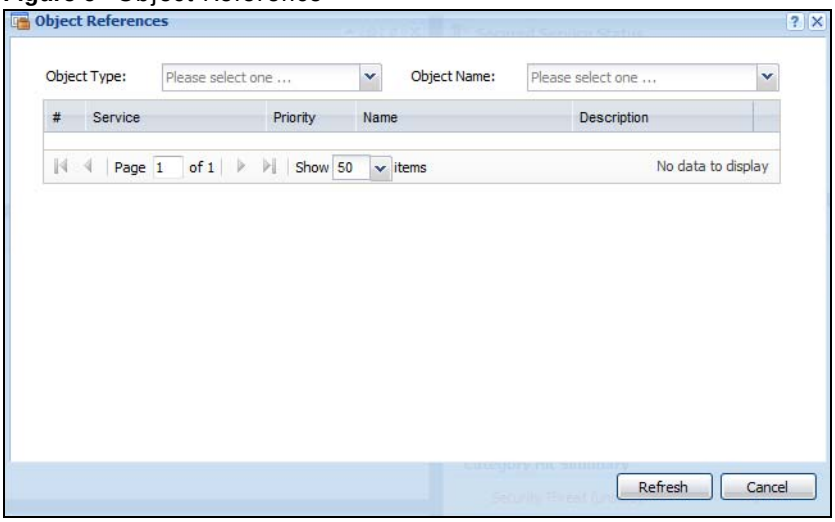
Click **Site MAP** to see an overview of links to the Web Configurator screens. Click a screen's link to go to that screen.

Figure 5 Site Map

Object Reference

Click **Object Reference** to open the **Object Reference** screen. Select the type of object and the individual object and click **Refresh** to show which configuration settings reference the object.

Figure 6 Object Reference



The fields vary with the type of object. The following table describes labels that can appear in this screen.

Table 4 Object References

LABEL	DESCRIPTION
Object Name	This identifies the object for which the configuration settings that use it are displayed. Click the object's name to display the object's configuration screen in the main window.
#	This field is a sequential value, and it is not associated with any entry.
Service	This is the type of setting that references the selected object. Click a service's name to display the service's configuration screen in the main window.
Priority	If it is applicable, this field lists the referencing configuration item's position in its list, otherwise **N/A** displays.
Name	This field identifies the configuration item that references the object.
Description	If the referencing configuration item has a description configured, it displays here.
Refresh	Click this to update the information in this screen.
Cancel	Click **Cancel** to close the screen.

CLI Messages

Click **CLI** to look at the CLI commands sent by the Web Configurator. Open the pop-up window and then click some menus in the web configurator to dislay the corresponding commands.

Figure 7 CLI Messages

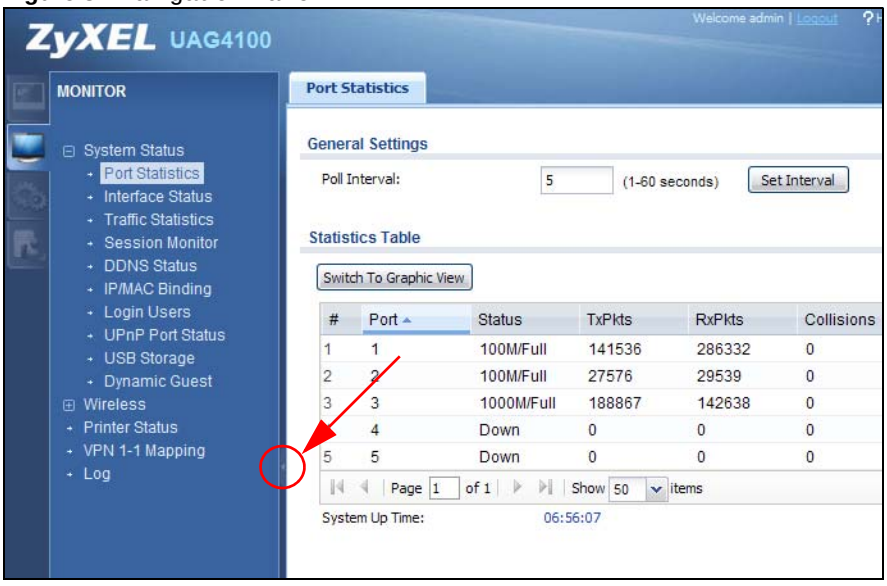
Click **Clear** to remove the currently displayed information.

See the Command Reference Guide for information about the commands.

1.4.3 Navigation Panel

Use the navigation panel menu items to open status and configuration screens. Click the arrow in the middle of the right edge of the navigation panel to hide the panel or drag to resize it. The following sections introduce the UAG's navigation panel menus and their screens.

Figure 8 Navigation Panel



Dashboard

The dashboard displays general device information, system status, system resource usage, licensed service status, and interface status in widgets that you can re-arrange to suit your needs. See Chapter 5 on page 49 for details on the dashboard.

Monitor Menu

The monitor menu screens display status and statistics information.

Table 5 Monitor Menu Screens Summary

FOLDER OR LINK	TAB	FUNCTION
System Status		
Port Statistics		Display packet statistics for each physical port.
Interface Status		Display general interface information and packet statistics.
Traffic Statistics		Collect and display traffic statistics.
Session Monitor		Display the status of all current sessions.
DDNS Status		Display the status of the UAG's DDNS domain names.
IP/MAC Binding		List the devices that have received an IP address from UAG interfaces using IP/MAC binding.
Login Users		List the users currently logged into the UAG.
UPnP Port Status		List the NAT port mapping rules that UPnP creates on the UAG.
USB Storage		Display details about a USB device connected to the UAG.
Dynamic Guest		List the dynamic guest accounts in the UAG's local database.
Wireless		
AP Information	AP List	Display information about the connected APs.
	Radio List	Display information about the radios of the connected APs.
Station Info		Display information about the connected stations.
Printer Status		
Printer Status		Display information about the connected statement printers.
VPN 1-1 Mapping		
VPN 1-1 Mapping		Display the status of the active users to which the UAG applied a VPN 1-1 mapping rule.
Statistics		Display statistics for each of the VPN 1-1 mapping rules.
Log		List log entries.
View Log		List log entries for the UAG.
View AP Log		Allow you to query connected APs and view log entries for them.
Dynamic Users Log		Display the UAG's dynamic guest account log messages.

Configuration Menu

Use the configuration menu screens to configure the UAG's features.

Table 6 Configuration Menu Screens Summary

FOLDER OR LINK	TAB	FUNCTION
Quick Setup		Quickly configure WAN interfaces.
Licensing		
Registration	Registration	Register the device and activate trial services.
	Service	View the licensed service status and upgrade licensed services.

Table 6 Configuration Menu Screens Summary (continued)

FOLDER OR LINK	TAB	FUNCTION
Wireless		
Controller	Configuration	Configure how the UAG handles APs that newly connect to the network.
AP Management	Mgnt. AP List	Edit wireless AP information, remove APs, and reboot them.
Network		
Interface	Port Role	Use this screen to set the UAG's flexible ports as LAN1 or LAN2.
	Ethernet	Manage Ethernet interfaces and virtual Ethernet interfaces.
	PPP	Create and manage PPPoE and PPTP interfaces.
	VLAN	Create and manage VLAN interfaces and virtual VLAN interfaces.
	Bridge	Create and manage bridges and virtual bridge interfaces.
	Trunk	Create and manage trunks (groups of interfaces) for load balancing.
Routing	Policy Route	Create and manage routing policies.
	Static Route	Create and manage IP static routing information.
Zone		Configure zones used to define various policies.
DDNS		Define and manage the UAG's DDNS domain names.
NAT		Set up and manage port forwarding rules.
VPN 1-1 Mapping	General	Enable and configure VPN 1-1 mapping to assign a public IP address to each of users that match the rules.
	Profile	Configure a pool profile which defines the public IP address that the UAG assigns to the matched users and the interface through which the user's traffic is forwarded.
HTTP Redirect		Set up and manage HTTP redirection rules.
SMTP Redirect		Set up and manage SMTP redirection rules.
ALG		Configure SIP, H.323, and FTP pass-through settings.
UPnP		enable UPnP and NAT-PMP on your UAG.
IP/MAC Binding	Summary	Configure IP to MAC address bindings for devices connected to each supported interface.
	Exempt List	Configure ranges of IP addresses to which the UAG does not apply IP/MAC binding.
Layer 2 Isolation	General	Enable layer-2 isolation on the UAG and the internal interface(s).
	White List	Enable and configure the white list.
IPnP		Enable IPnP on the UAG and the internal interface(s).
Web Authentication	Web Authentication	Define rules to force user authentication for network access.
	Walled Garden	Create walled garden links that display in the login screen.
	Adverstisement	Enable and set advertisement links.
Firewall	Firewall	Create and manage level-3 traffic rules.
	Session Limit	Limit the number of concurrent client NAT/firewall sessions.
Billing	General	Configure the general billing settings, such as the accounting method.

Table 6 Configuration Menu Screens Summary (continued)

FOLDER OR LINK	TAB	FUNCTION
	Billing Profile	Configure the billing profiles for the web-based account generator and each button on the connected statement printer.
	Discount	Configure discount price plans.
	Payment Service	Enable online payment service and configure the service pages.
Printer Manager	General	Configure the printer list and enable printer management.
	Printout Configuration	Customize the account printout.
Free Time	Free Time	Allow users to get a free account for Internet surfing during the specified time period.
SMS	SMS	Enable the SMS service to send dynamic guest account information in text messages.
BWM	BWM	Enable and configure bandwidth management rules.
Object		
User/Group	User	Create and manage users.
	Group	Create and manage groups of users.
	Setting	Manage default settings for all users, general settings for user sessions, and rules to force user authentication.
AP Profile	Radio	Create and manage wireless radio settings files that can be associated with different APs.
	SSID	Create and manage wireless SSID, security, and MAC filtering settings files that can be associated with different APs.
Address	Address	Create and manage host, range, and network (subnet) addresses.
	Address Group	Create and manage groups of addresses.
Service	Service	Create and manage TCP and UDP services.
	Service Group	Create and manage groups of services.
Schedule	Schedule	Create one-time and recurring schedules.
AAA Server	RADIUS	Configure the RADIUS settings.
Auth. Method	Authentication Method	Create and manage ways of authenticating users.
Certificate	My Certificates	Create and manage the UAG's certificates.
	Trusted Certificates	Import and manage certificates from trusted sources.
ISP Account	ISP Account	Create and manage ISP account information for PPPoE/PPTP interfaces.
System		
Host Name		Configure the system and domain name for the UAG.
USB Storage	Settings	Configure the settings for the connected USB devices.
Date/Time		Configure the current date, time, and time zone in the UAG.
Console Speed		Set the console speed.
DNS		Configure the DNS server and address records for the UAG.
WWW	Service Control	Configure HTTP, HTTPS, and general authentication.
	Login Page	Configure how the login and access user screens look.
SSH		Configure SSH server and SSH service settings.
TELNET		Configure telnet server settings for the UAG.
FTP		Configure FTP server settings.

Table 6 Configuration Menu Screens Summary (continued)

FOLDER OR LINK	TAB	FUNCTION
SNMP		Configure SNMP communities and services.
Language		Select the Web Configurator language.
Log & Report		
Email Daily Report		Configure where and how to send daily reports and what reports to send.
Log Settings		Configure the system log, e-mail logs, and remote syslog servers.

Maintenance Menu

Use the maintenance menu screens to manage configuration and firmware files, run diagnostics, and reboot or shut down the UAG.

Table 7 Maintenance Menu Screens Summary

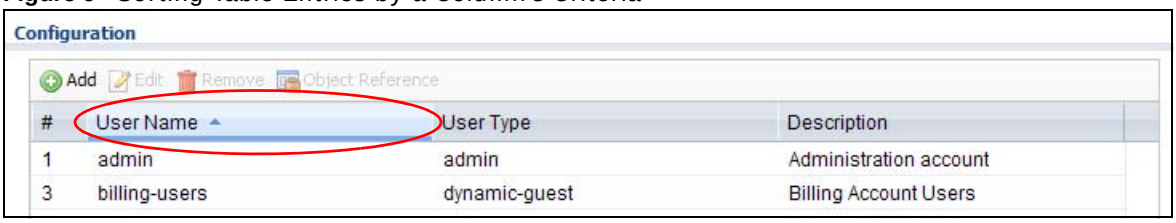
FOLDER OR LINK	TAB	FUNCTION
File Manager	Configuration File	Manage and upload configuration files for the UAG.
	Firmware Package	View the current firmware version and to upload firmware.
	Shell Script	Manage and run shell script files for the UAG.
Diagnostics	Diagnostic	Collect diagnostic information.
	Packet Capture	Capture packets for analysis.
	Core Dump	Connect a USB device to the UAG and save the UAG operating system kernel to it here.
	System Log	Connect a USB device to the UAG and archive the UAG system logs to it here.
Packet Flow Explore	Routing Status	Check how the UAG determines where to route a packet.
	SNAT Status	View a clear picture on how the UAG converts a packet's source IP address and check the related settings.
Reboot		Restart the UAG.
Shutdown		Turn off the UAG.

1.4.4 Tables and Lists

Web Configurator tables and lists are flexible with several options for how to display their entries.

Click a column heading to sort the table's entries according to that column's criteria.

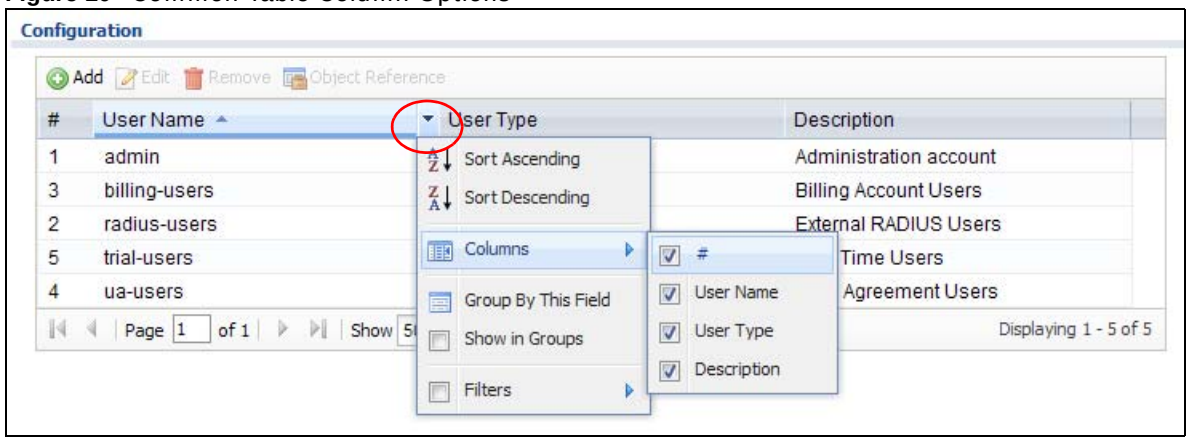
Figure 9 Sorting Table Entries by a Column's Criteria



Click the down arrow next to a column heading for more options about how to display the entries. The options available vary depending on the type of fields in the column. Here are some examples of what you can do:

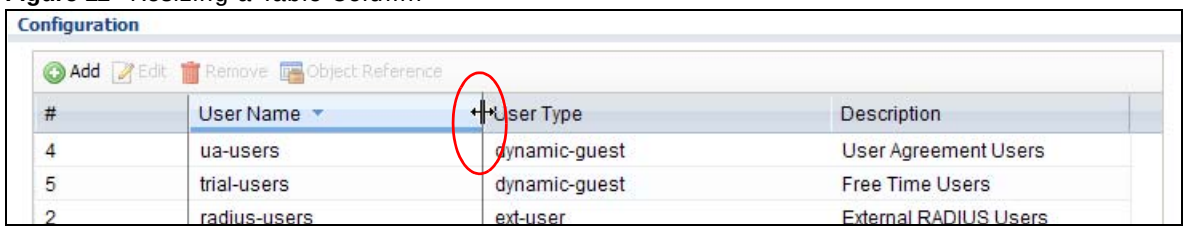
- Sort in ascending or descending (reverse) alphabetical order
- Select which columns to display
- Group entries by field
- Show entries in groups
- Filter by mathematical operators (<, >, or =) or searching for text

Figure 10 Common Table Column Options



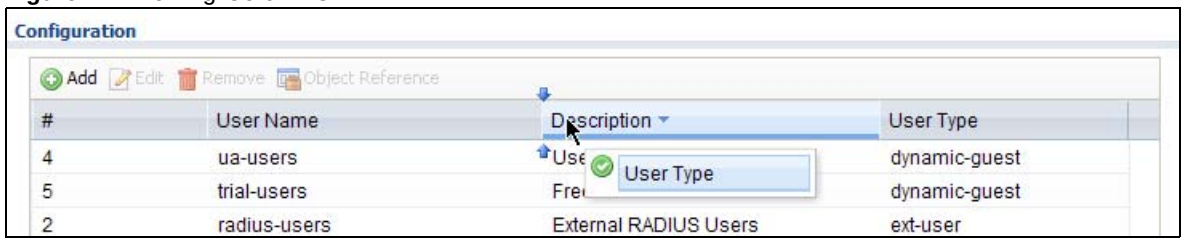
Select a column heading cell's right border and drag to re-size the column.

Figure 11 Resizing a Table Column



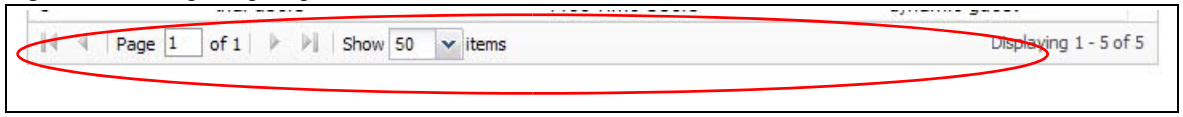
Select a column heading and drag and drop it to change the column order. A green check mark displays next to the column's title when you drag the column to a valid new location.

Figure 12 Moving Columns



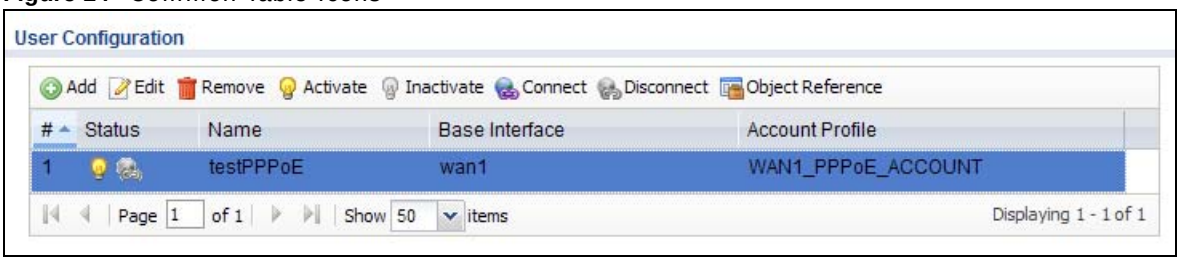
Use the icons and fields at the bottom of the table to navigate to different pages of entries and control how many entries display at a time.

Figure 13 Navigating Pages of Table Entries



The tables have icons for working with table entries. You can often use the [Shift] or [Ctrl] key to select multiple entries to remove, activate, or deactivate.

Figure 14 Common Table Icons



Here are descriptions for the most common table icons.

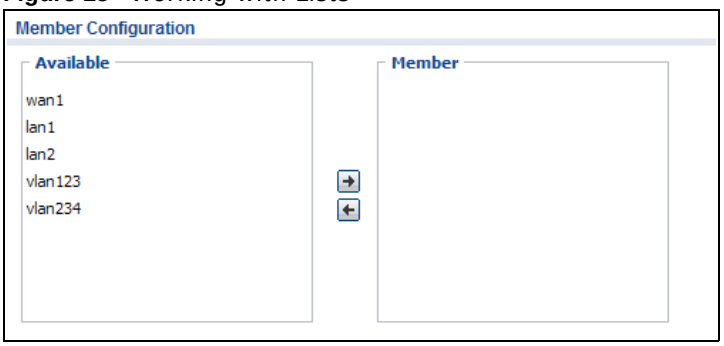
Table 8 Common Table Icons

LABEL	DESCRIPTION
Add	Click this to create a new entry. For features where the entry's position in the numbered list is important (features where the UAG applies the table's entries in order like the firewall for example), you can select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings. In some tables you can just click a table entry and edit it directly in the table. For those types of tables small red triangles display for table entries with changes that you have not yet applied.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Connect	To connect an entry, select it and click **Connect**.
Disconnect	To disconnect an entry, select it and click **Disconnect**.
Object Reference	Select an entry and click **Object Reference** to check which settings use the entry.
Move	To change an entry's position in a numbered list, select it and click **Move** to display a field to type a number for where you want to put that entry and press [ENTER] to move the entry to the number that you typed. For example, if you type 6, the entry you are moving becomes number 6 and the previous entry 6 (if there is one) gets pushed up (or down) one.

Working with Lists

When a list of available entries displays next to a list of selected entries, you can often just double-click an entry to move it from one list to the other. In some lists you can also use the [Shift] or [Ctrl] key to select multiple entries, and then use the arrow button to move them to the other list.

Figure 15 Working with Lists



1.5 Stopping the UAG

Always use **Maintenance > Shutdown > Shutdown** or the shutdown command before you turn off the UAG or remove the power. Not doing so can cause the firmware to become corrupt.

2

Hardware Installation and Connection

2.1 Wall Mounting

You may need screw anchors if mounting on a concrete or brick wall.

Table 9 Wall Mounting Information

Distance between holes	206 mm
Self-tapping screws (Diameter: 3 mm)	Two
Screw anchors (optional)	Two

1 Select a position free of obstructions on a wall strong enough to hold the weight of the device.

2 Mark two holes on the wall at the appropriate distance apart for the screws.

Be careful to avoid damaging pipes or cables located inside the wall when drilling holes for the screws.

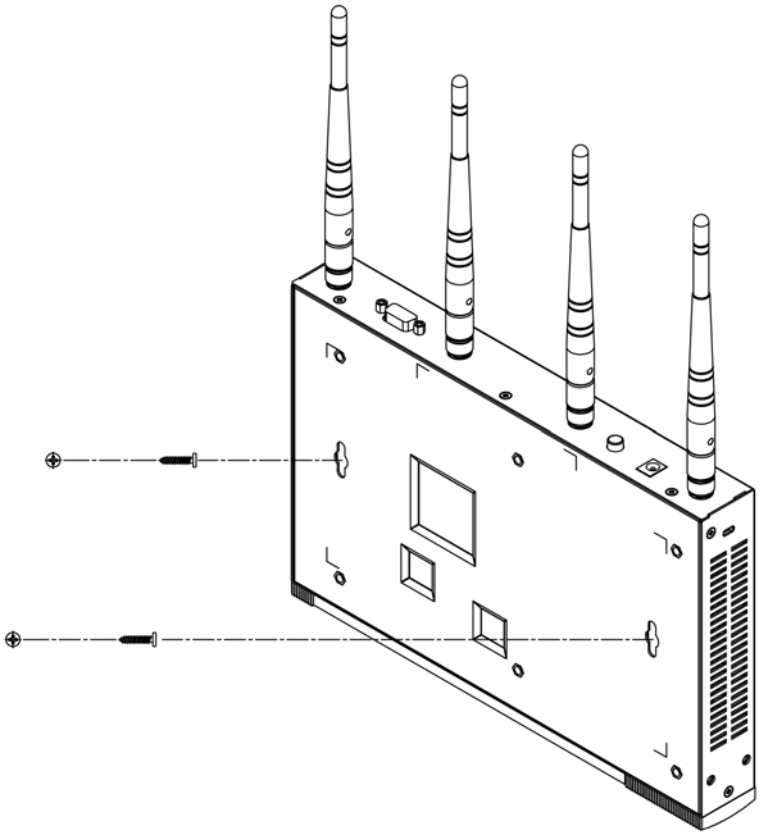
3 If using screw anchors, drill two holes for the screw anchors into the wall. Push the anchors into the full depth of the holes, then insert the screws into the anchors. Do not insert the screws all the way in - leave a small gap of about 0.5 cm.

If not using screw anchors, use a screwdriver to insert the screws into the wall. Do not insert the screws all the way in - leave a gap of about 0.5 cm.

4 Make sure the screws are fastened well enough to hold the weight of the UAG with the connection cables.

5 Align the holes on the back of the UAG with the screws on the wall. Hang the UAG on the screws.

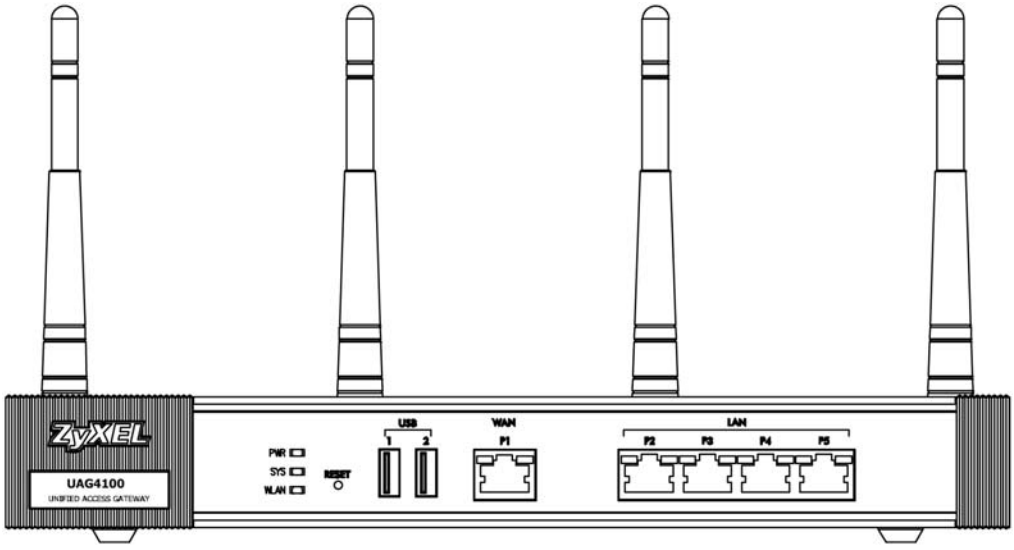
Figure 16 Wall Mounting Example



2.2 Front Panel

This section introduces the UAG's front panel.

Figure 17 UAG Front Panel



1000Base-T Ports

The 1000Base-T auto-negotiating, auto-crossover Ethernet ports support 10/100/1000 Mbps Gigabit Ethernet so the speed can be 100 Mbps or 1000 Mbps. The duplex mode is full at 1000 Mbps and half or full at 10/100 Mbps. An auto-negotiating port can detect and adjust to the optimum Ethernet speed (10/100/1000 Mbps) and duplex mode (full duplex or half duplex) of the connected device. An auto-crossover (auto-MDI/MDI-X) port automatically works with a straight-through or crossover Ethernet cable. The factory default negotiation settings for the Ethernet ports on the UAG are speed: auto, duplex: auto, and flow control: on (you cannot configure the flow control setting, but the UAG can negotiate with the peer and turn it off if needed).

USB 2.0 Ports

Connect a USB storage device to a USB port on the UAG to archive the UAG system logs or save the UAG operating system kernel to it.

2.2.1 Front Panel LEDs

The following tables describe the LEDs.

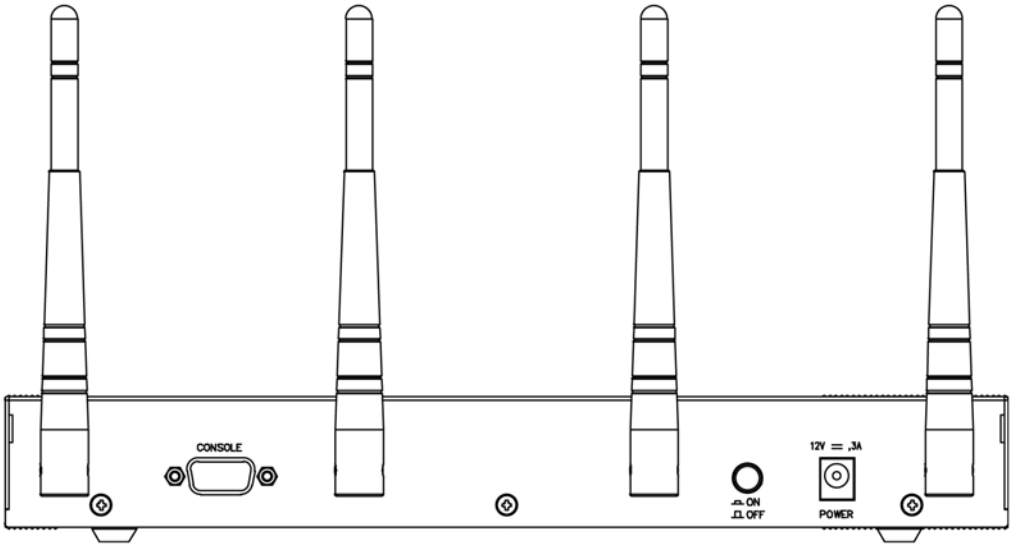
Table 10 Front Panel LEDs

LED	COLOR	STATUS	DESCRIPTION
PWR		Off	The UAG is turned off.
	Green	On	The UAG is turned on.
	Red	On	There is a hardware component failure. Shut down the device, wait for a few minutes and then restart the device (see Section 1.5 on page 30). If the LED turns red again, then please contact your vendor.
SYS	Green	Off	The UAG is not ready or has failed.
		On	The UAG is ready and running.
		Blinking	The UAG is booting.
	Red	On	The UAG had an error or has failed.
WLAN	Green	On	The wireless network is activated.
		Blinking	The UAG is communicating with other wireless clients.
		Off	The wireless network is not activated.
P1~P5	Green	On	This port has a successful link to a 10/100 Mbps Ethernet network
		Blinking	The UAG is sending or receiving packets to/from a 10/100 Mbps Ethernet network on this port
	Orange	On	This port has a successful link to a 1000 Mbps Ethernet network.
		Blinking	The UAG is sending or receiving packets to/from a 1000 Mbps Ethernet network on this port
		Off	There is no connection on this port.

2.3 Rear Panel

The following figure shows the rear panel of the UAG. The rear panel contains a console port, a power switch and a connector for the power receptacle.

Figure 18 Rear Panel



Console Port

Connect this port to your computer (using an RS-232 cable) if you want to configure the UAG using the command line interface (CLI) via the console port.

For local management, you can use a computer with terminal emulation software configured to the following parameters:

- VT100 terminal emulation
- 115200 bps
- No parity, 8 data bits, 1 stop bit
- No flow control

Connect the male 9-pin end of the RS-232 console cable to the console port of the UAG. Connect the female end to a serial port (COM1, COM2 or other COM port) of your computer.

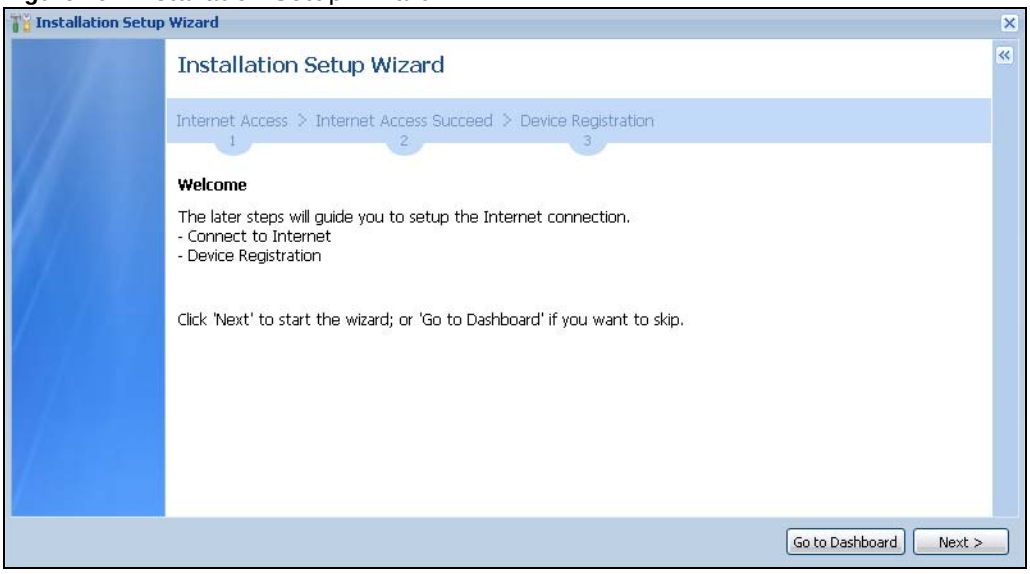
3

Installation Setup Wizard

3.1 Installation Setup Wizard Screens

When you log into the Web Configurator for the first time or when you reset the UAG to its default configuration, the **Installation Setup Wizard** screen displays. This wizard helps you configure Internet connection settings and activate subscription services. This chapter provides information on configuring the Web Configurator's installation setup wizard. See the feature-specific chapters in this User's Guide for background information.

Figure 19 Installation Setup Wizard



- Click the double arrow in the upper right corner to display or hide the help.
- Click **Go to Dashboard** to skip the installation setup wizard or click **Next** to start configuring for Internet access.

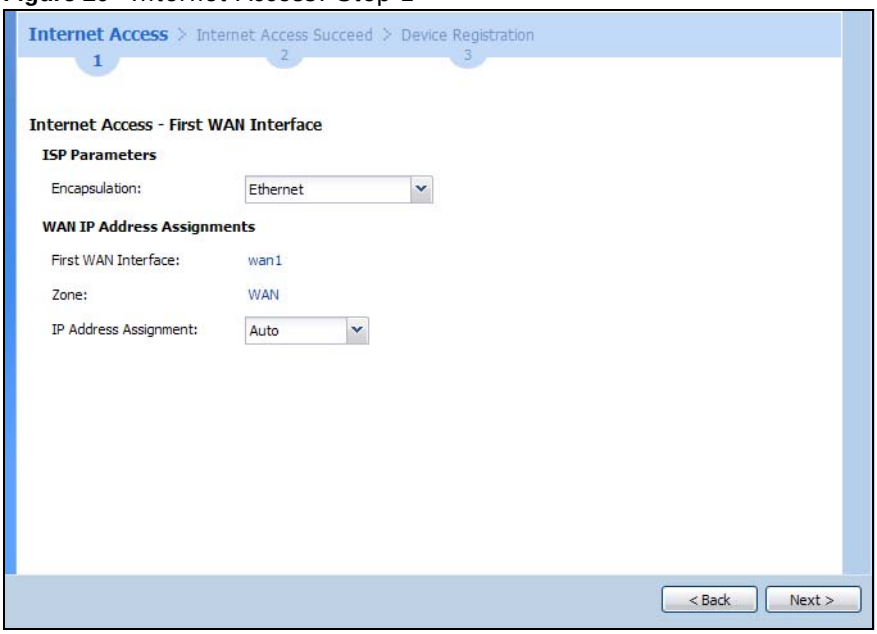
3.1.1 Internet Access Setup - WAN Interface

Use this screen to set how many WAN interfaces to configure and the first WAN interface's type of encapsulation and method of IP address assignment.

The screens vary depending on the encapsulation type. Refer to information provided by your ISP to know what to enter in each field. Leave a field blank if you don't have that information.

Note: Enter the Internet access information exactly as your ISP gave it to you.

Figure 20 Internet Access: Step 1



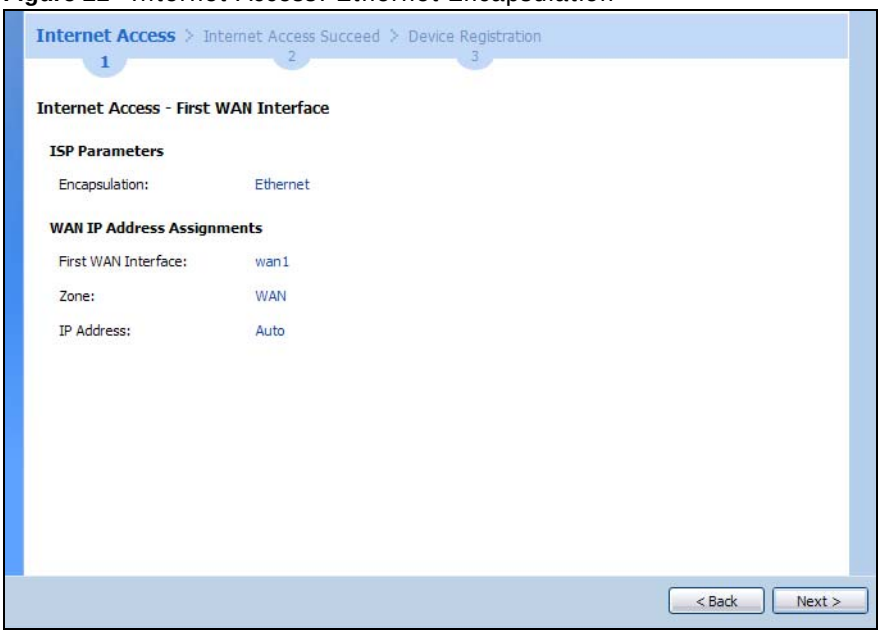
- **Encapsulation**: Choose the **Ethernet** option when the WAN port is used as a regular Ethernet. Otherwise, choose **PPPoE** or **PPTP** for a dial-up connection according to the information from your ISP.
- **First WAN Interface**: This is the interface you are configuring for Internet access.
- **Zone**: This is the security zone to which this interface and Internet connection belong.
- **IP Address Assignment**: Select **Auto** if your ISP did not assign you a fixed IP address. Select **Static** if the ISP assigned a fixed IP address.

3.1.2 Internet Access: Ethernet

This screen is read-only if you set the previous screen's **IP Address Assignment** field to **Auto**. Use this screen to configure your IP address settings.

Note: Enter the Internet access information exactly as given to you by your ISP.

Figure 21 Internet Access: Ethernet Encapsulation



- **Encapsulation**: This displays the type of Internet connection you are configuring.
- **First WAN Interface**: This is the number of the interface that will connect with your ISP.
- **Zone:** This is the security zone to which this interface and Internet connection will belong.
- **IP Address**: Enter your (static) public IP address. **Auto** displays if you selected **Auto** as the **IP Address Assignment** in the previous screen.

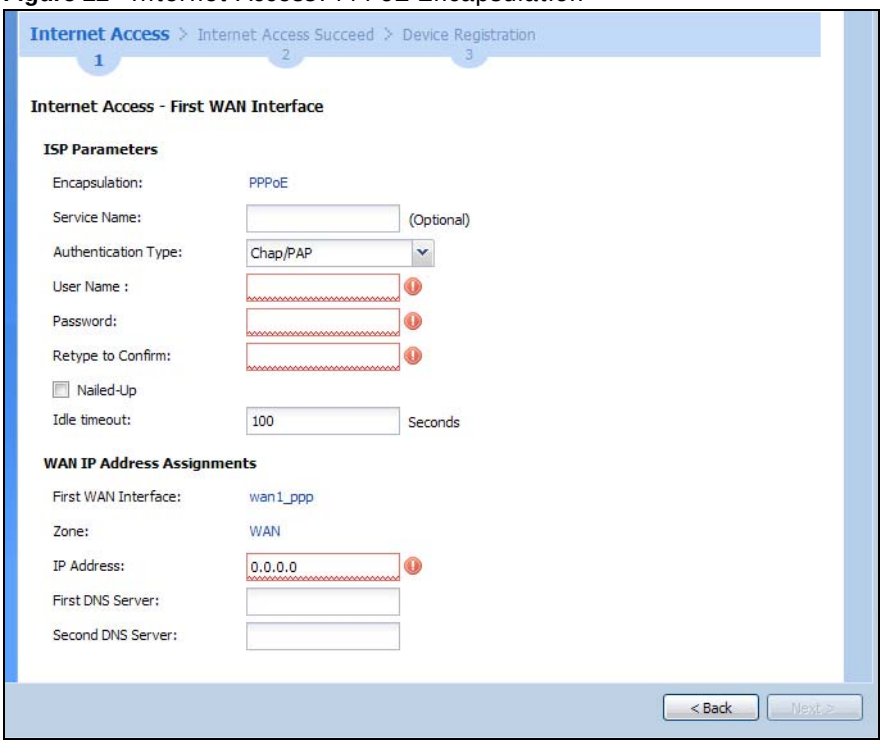
The following fields display if you selected static IP address assignment.

- **IP Subnet Mask**: Enter the subnet mask for this WAN connection's IP address.
- **Gateway IP Address**: Enter the IP address of the router through which this WAN connection will send traffic (the default gateway).
- **First / Second DNS Server**: These fields display if you selected static IP address assignment. The Domain Name System (DNS) maps a domain name to an IP address and vice versa. Enter a DNS server's IP address(es). The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The UAG uses these (in the order you specify here) to resolve domain names for DDNS and the time server. Leave the field as 0.0.0.0 if you do not want to configure DNS servers.

3.1.3 Internet Access: PPPoE

Note: Enter the Internet access information exactly as given to you by your ISP.

Figure 22 Internet Access: PPPoE Encapsulation



3.1.3.1 ISP Parameters

- Type the PPPoE **Service Name** from your service provider. PPPoE uses a service name to identify and reach the PPPoE server. You can use alphanumeric and -_@$./ characters, and it can be up to 64 characters long.
- **Authentication Type** - Select an authentication protocol for outgoing connection requests. Options are:
  - **CHAP/PAP** - Your UAG accepts either CHAP or PAP when requested by the remote node.
  - **CHAP** - Your UAG accepts CHAP only.
  - **PAP** - Your UAG accepts PAP only.
  - **MSCHAP** - Your UAG accepts MSCHAP only.
  - **MSCHAP-V2** - Your UAG accepts MSCHAP-V2 only.
- Type the **User Name** given to you by your ISP. You can use alphanumeric and -_@$./ characters, and it can be up to 31 characters long.
- Type the **Password** associated with the user name. Use up to 64 ASCII characters except the [] and ?. This field can be blank.
- Select **Nailed-Up** if you do not want the connection to time out. Otherwise, type the **Idle Timeout** in seconds that elapses before the router automatically disconnects from the PPPoE server.

3.1.3.2 WAN IP Address Assignments

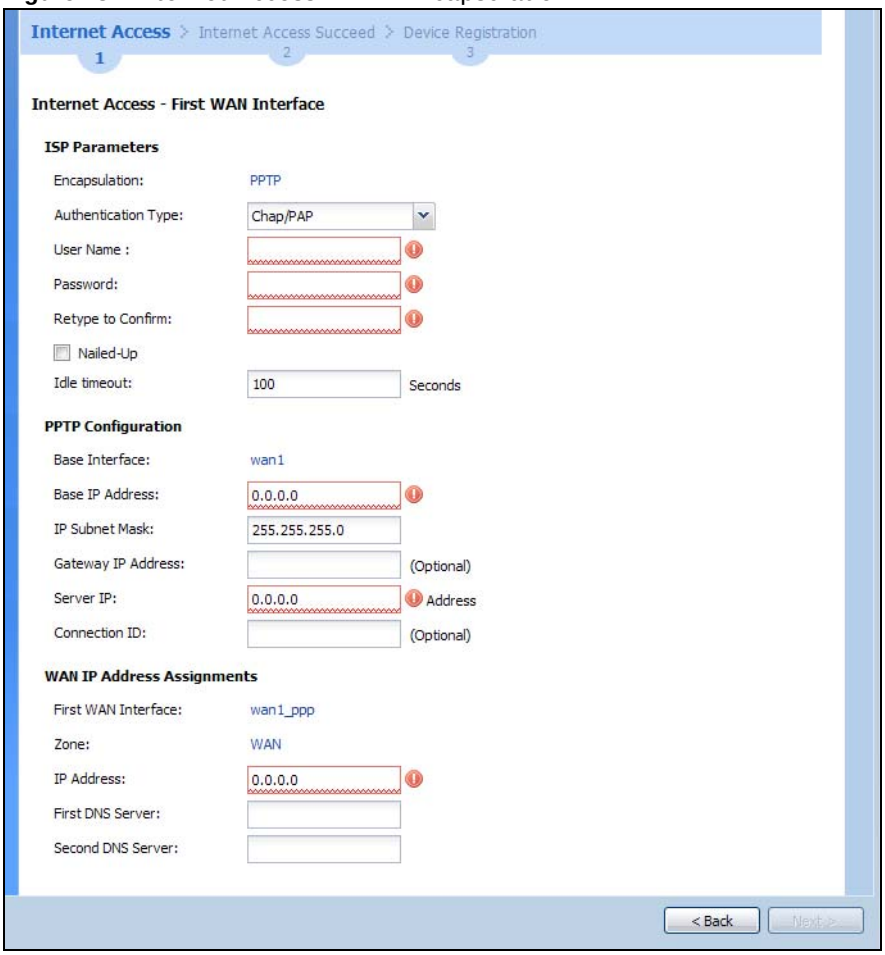
- **First WAN Interface**: This is the name of the interface that will connect with your ISP.
- **Zone:** This is the security zone to which this interface and Internet connection will belong.
- **IP Address**: Enter your (static) public IP address. **Auto** displays if you selected **Auto** as the **IP Address Assignment** in the previous screen.

- **First / Second DNS Server**: These fields display if you selected static IP address assignment. The Domain Name System (DNS) maps a domain name to an IP address and vice versa. Enter a DNS server's IP address(es). The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The UAG uses these (in the order you specify here) to resolve domain names for DDNS and the time server. Leave the field as 0.0.0.0 if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a machine in order to access it.

3.1.4 Internet Access: PPTP

Note: Enter the Internet access information exactly as given to you by your ISP.

Figure 23 Internet Access: PPTP Encapsulation



3.1.5 ISP Parameters

- **Authentication Type** - Select an authentication protocol for outgoing calls. Options are:
  - **CHAP/PAP** - Your UAG accepts either CHAP or PAP when requested by the remote node.
  - **CHAP** - Your UAG accepts CHAP only.
  - **PAP** - Your UAG accepts PAP only.
  - **MSCHAP** - Your UAG accepts MSCHAP only.
  - **MSCHAP-V2** - Your UAG accepts MSCHAP-V2 only.

- Type the **User Name** given to you by your ISP. You can use alphanumeric and -_@$./ characters, and it can be up to 31 characters long.
- Type the **Password** associated with the user name. Use up to 64 ASCII characters except the [] and ?. This field can be blank. Re-type your password in the next field to confirm it.
- Select **Nailed-Up** if you do not want the connection to time out. Otherwise, type the **Idle Timeout** in seconds that elapses before the router automatically disconnects from the PPTP server.

3.1.5.1 PPTP Configuration

- **Base Interface**: This identifies the Ethernet interface you configure to connect with a modem or router.
- Type a **Base IP Address** (static) assigned to you by your ISP.
- Type the **IP Subnet Mask** assigned to you by your ISP (if given).
- **Gateway IP Address**: Enter the IP address of the gateway if any.
- **Server IP**: Type the IP address of the PPTP server.
- Type a **Connection ID** or connection name. It must follow the “c:id” and “n:name” format. For example, C:12 or N:My ISP. This field is optional and depends on the requirements of your broadband modem or router. You can use alphanumeric and -_: characters, and it can be up to 31 characters long.

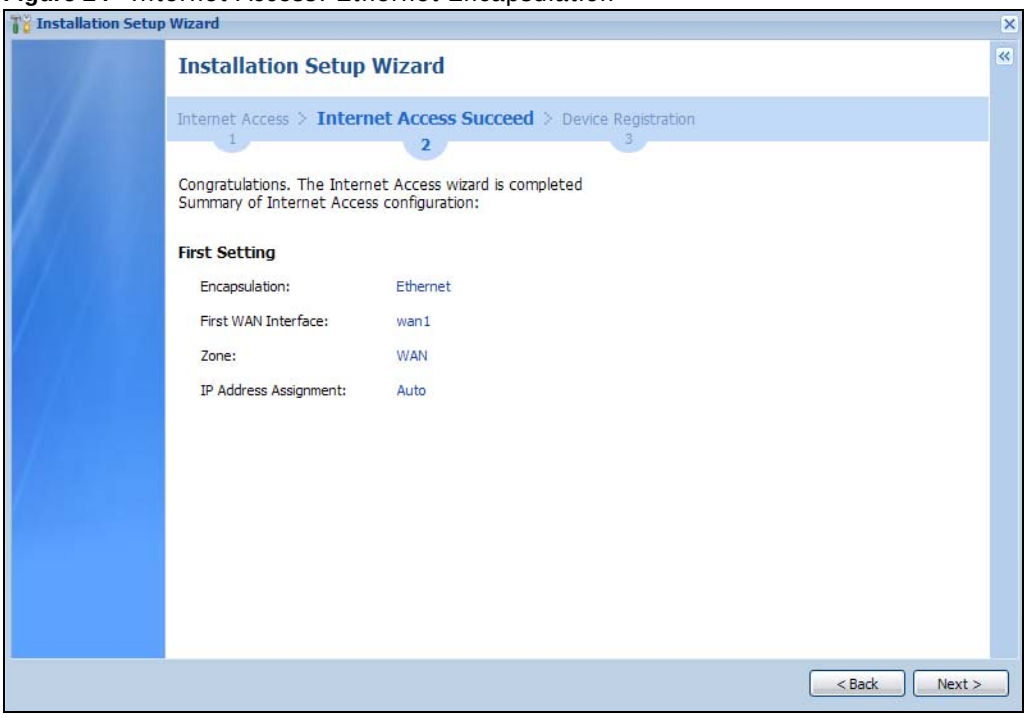
3.1.5.2 WAN IP Address Assignments

- **First WAN Interface**: This is the connection type on the interface you are configuring to connect with your ISP.
- **Zone** This is the security zone to which this interface and Internet connection will belong.
- **IP Address**: Enter your (static) public IP address. **Auto** displays if you selected **Auto** as the **IP Address Assignment** in the previous screen.
- **First / Second DNS Server**: These fields display if you selected static IP address assignment. The Domain Name System (DNS) maps a domain name to an IP address and vice versa. Enter a DNS server's IP address(es). The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The UAG uses these (in the order you specify here) to resolve domain names for DDNS and the time server. Leave the field as 0.0.0.0 if you do not want to configure DNS servers.

3.1.6 Internet Access - Finish

You have set up your UAG to access the Internet. A screen displays with your settings. If they are not correct, click **Back**.

Figure 24 Internet Access: Ethernet Encapsulation



Click **Next** and use the following screen to perform a basic registration (see Section 3.2 on page 41).

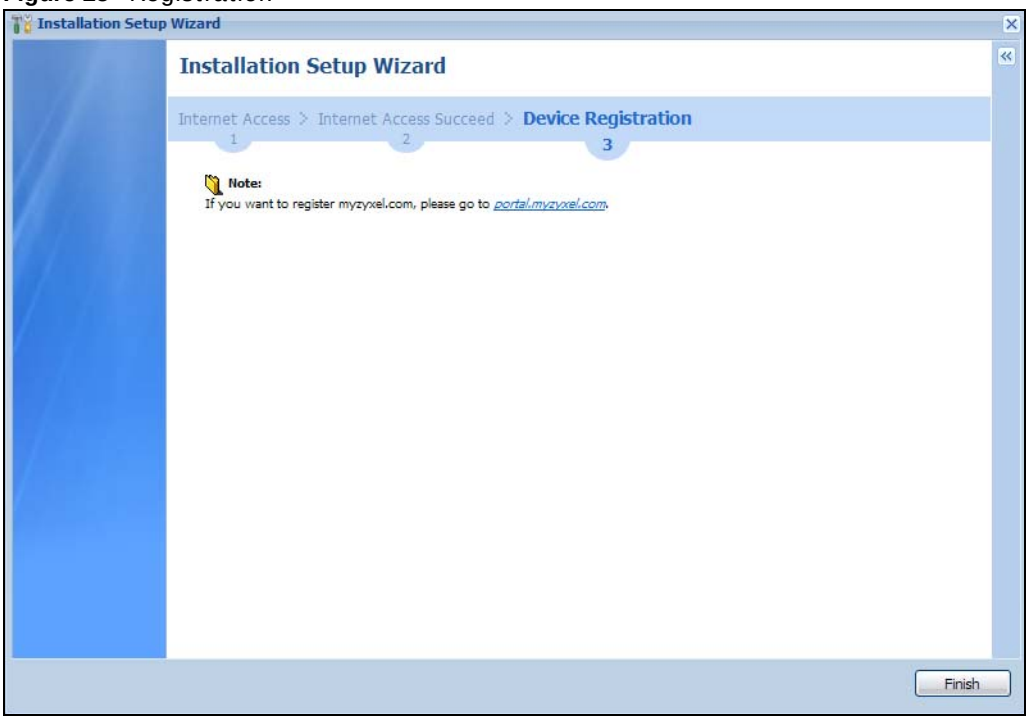
Alternatively, close the window to exit the wizard.

3.2 Device Registration

Go to http://portal.myZyXEL.com with the UAG's serial number and LAN MAC address to register it if you have not already done so.

Note: You must be connected to the Internet to register. Use the **Registration > Service** screen to update your service subscription status.

Figure 25 Registration



4

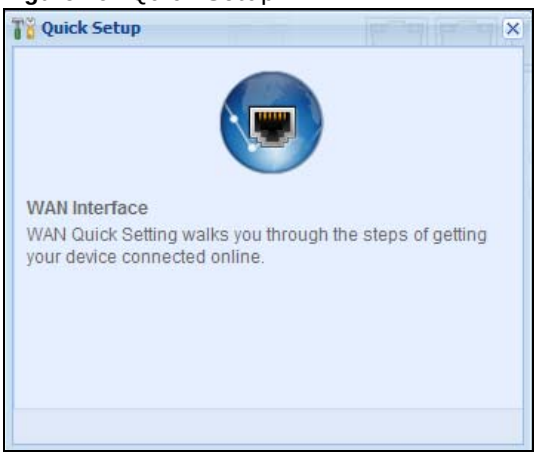
Quick Setup Wizards

4.1 Quick Setup Overview

The Web Configurator's quick setup wizards help you configure Internet connection settings. This chapter provides information on configuring the quick setup screens in the Web Configurator. See the feature-specific chapters in this User's Guide for background information.

In the Web Configurator, click **Configuration > Quick Setup** to open the first **Quick Setup** screen.

Figure 26 Quick Setup



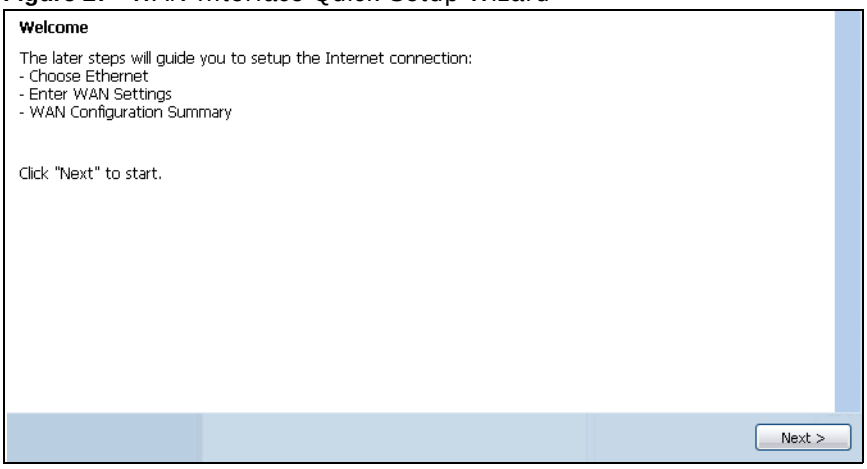
- **WAN Interface**

  Click this link to open a wizard to set up a WAN (Internet) connection. This wizard creates matching ISP account settings in the UAG if you use PPPoE or PPTP. See Section 4.2 on page 43.

4.2 WAN Interface Quick Setup

Click **WAN Interface** in the main **Quick Setup** screen to open the **WAN Interface Quick Setup Wizard Welcome** screen. Use these screens to configure an interface to connect to the Internet. Click **Next**.

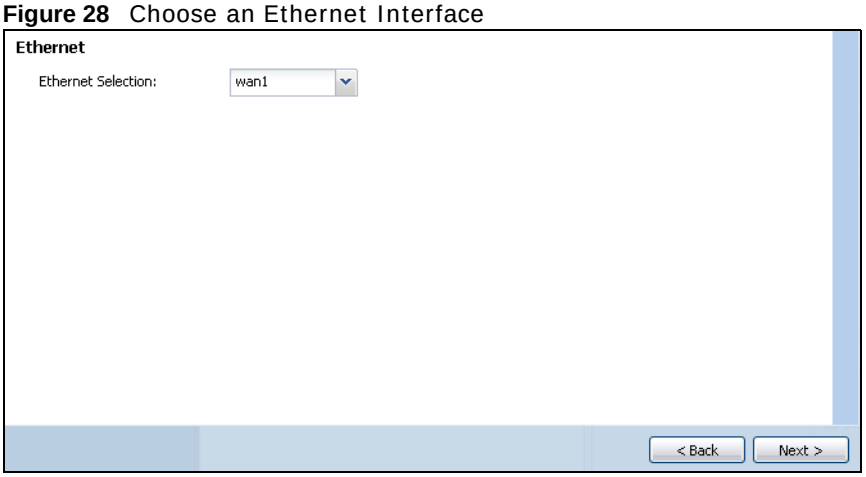
Figure 27 WAN Interface Quick Setup Wizard



4.2.1 Choose an Ethernet Interface

Select the Ethernet interface that you want to configure for a WAN connection and click **Next**.

Figure 28 Choose an Ethernet Interface

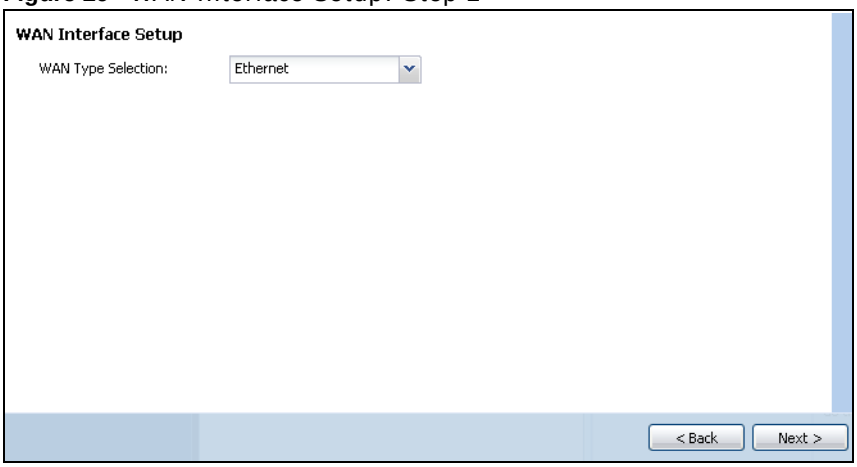


4.2.2 Select WAN Type

WAN Type Selection: Select the type of encapsulation this connection is to use. Choose **Ethernet** when the WAN port is used as a regular Ethernet.

Otherwise, choose **PPPoE** or **PPTP** for a dial-up connection according to the information from your ISP.

Figure 29 WAN Interface Setup: Step 2



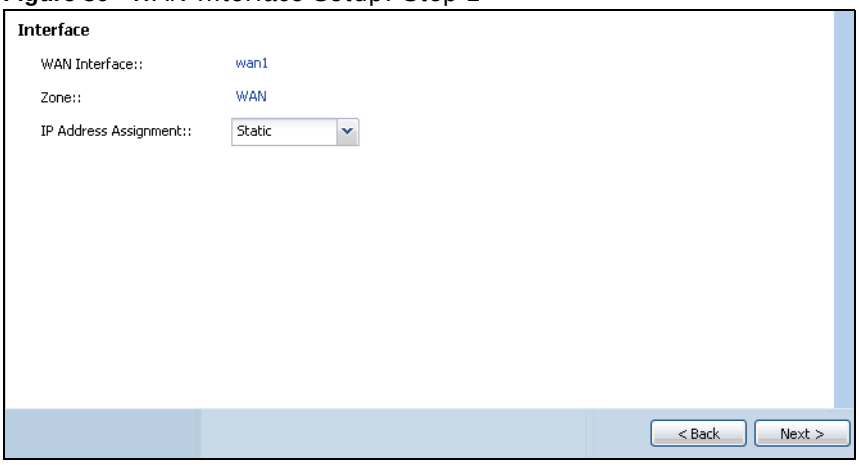
The screens vary depending on what encapsulation type you use. Refer to information provided by your ISP to know what to enter in each field. Leave a field blank if you don't have that information.

Note: Enter the Internet access information exactly as your ISP gave it to you.

4.2.3 Configure WAN Settings

Use this screen to select whether the interface should use a fixed or dynamic IP address.

Figure 30 WAN Interface Setup: Step 2



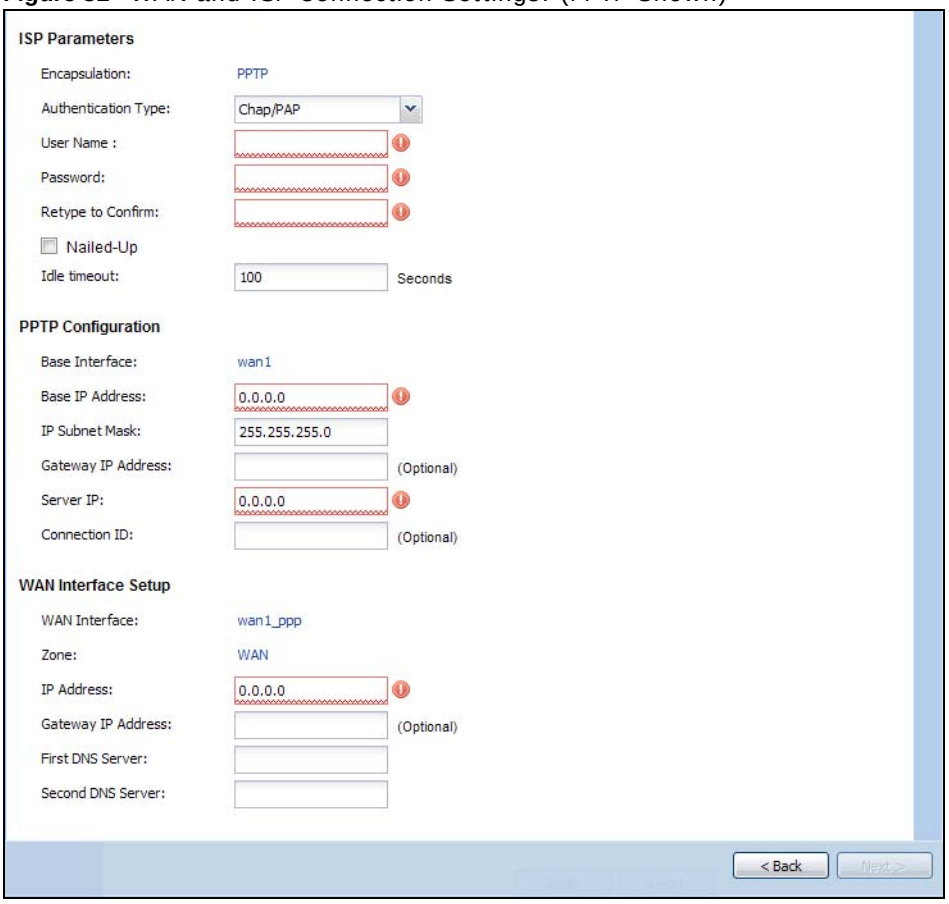
- **WAN Interface**: This is the interface you are configuring for Internet access.
- **Zone**: This is the security zone to which this interface and Internet connection belong.
- **IP Address Assignment**: Select **Auto** If your ISP did not assign you a fixed IP address. Select **Static** if you have a fixed IP address.

4.2.4 WAN and ISP Connection Settings

Use this screen to configure the ISP and WAN interface settings. This screen is read-only if you set the **IP Address Assignment** to **Auto**.

Note: Enter the Internet access information exactly as your ISP gave it to you.

Figure 31 WAN and ISP Connection Settings: (PPTP Shown)



The following table describes the labels in this screen.

Table 11 WAN and ISP Connection Settings

LABEL	DESCRIPTION
ISP Parameter	This section appears if the interface uses a PPPoE or PPTP Internet connection.
Encapsulation	This displays the type of Internet connection you are configuring.
Authentication Type	Use the drop-down list box to select an authentication protocol for outgoing calls. Options are: **CHAP/PAP** - Your UAG accepts either CHAP or PAP when requested by this remote node. **CHAP** - Your UAG accepts CHAP only. **PAP** - Your UAG accepts PAP only. **MSCHAP** - Your UAG accepts MSCHAP only. **MSCHAP-V2** - Your UAG accepts MSCHAP-V2 only.
User Name	Type the user name given to you by your ISP. You can use alphanumeric and -_@$./ characters, and it can be up to 31 characters long.
Password	Type the password associated with the user name above. Use up to 64 ASCII characters except the [] and ?. This field can be blank.
Retype to Confirm	Type your password again for confirmation.
Nailed-Up	Select **Nailed-Up** if you do not want the connection to time out.

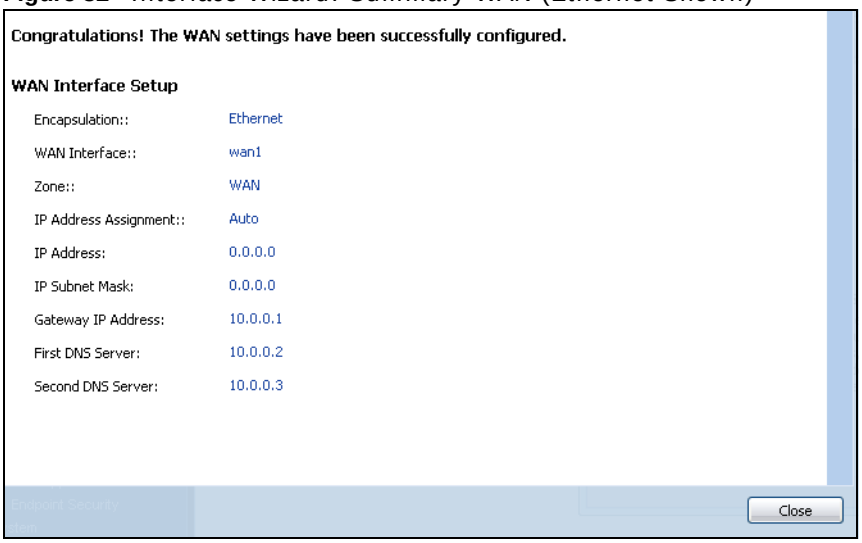
Table 11 WAN and ISP Connection Settings (continued)

LABEL	DESCRIPTION
Idle Timeout	Type the time in seconds that elapses before the router automatically disconnects from the PPPoE server. 0 means no timeout.
PPTP Configuration	This section only appears if the interface uses a PPPoE or PPTP Internet connection.
Base Interface	This displays the identity of the Ethernet interface you configure to connect with a modem or router.
Base IP Address	Type the (static) IP address assigned to you by your ISP.
IP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
Gateway IP Address	This field only displays for an interface with a static IP address. Enter the IP address of the gateway device.
Server IP	Type the IP address of the PPTP server.
Connection ID	Enter the connection ID or connection name in this field. It must follow the "c:id" and "n:name" format. For example, C:12 or N:My ISP. This field is optional and depends on the requirements of your DSL modem. You can use alphanumeric and -_: characters, and it can be up to 31 characters long.
WAN Interface Setup	
WAN Interface	This displays the identity of the interface you configure to connect with your ISP.
Zone	This field displays to which security zone this interface and Internet connection will belong.
IP Address	This field is read-only when the WAN interface uses a dynamic IP address. If your WAN interface uses a static IP address, enter it in this field.
Gateway IP Address	This field only displays for an interface with a static IP address. Enter the gateway's IP address.
First DNS Server Second DNS Server	These fields only display for an interface with a static IP address. Enter the DNS server IP address(es) in the field(s) to the right. Leave the field as **0.0.0.0** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a machine in order to access it. DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The UAG uses a system DNS server (in the order you specify here) to resolve domain names for DDNS and the time server.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.

4.2.5 Quick Setup Interface Wizard: Summary

This screen displays the WAN interface's settings.

Figure 32 Interface Wizard: Summary WAN (Ethernet Shown)



The following table describes the labels in this screen.

Table 12 Interface Wizard: Summary WAN

LABEL	DESCRIPTION
Encapsulation	This displays what encapsulation this interface uses to connect to the Internet.
Service Name	This field only appears for a PPPoE interface. It displays the PPPoE service name specified in the ISP account.
Server IP	This field only appears for a PPTP interface. It displays the IP address of the PPTP server.
User Name	This is the user name given to you by your ISP.
Nailed-Up	If **No** displays the connection will not time out. **Yes** means the UAG uses the idle timeout.
Idle Timeout	This is how many seconds the connection can be idle before the router automatically disconnects from the PPPoE server. 0 means no timeout.
Connection ID	If you specified a connection ID, it displays here.
WAN Interface	This identifies the interface you configure to connect with your ISP.
Zone	This field displays to which security zone this interface and Internet connection will belong.
IP Address Assignment	This field displays whether the WAN IP address is static or dynamic (**Auto**).
IP Address	This field displays the WAN IP address.
IP Subnet Mask	This field only appears for an Ethernet interface. It displays the interface's IP subnet mask.
Gateway IP Address	This field only appears for an Ethernet interface. It displays the IP address of the gateway.
First DNS Server Second DNS Server	If the **IP Address Assignment** is **Static**, these fields display the DNS server IP address(es).
Close	Click **Close** to exit the wizard.

5

Dashboard

5.1 Overview

Use the **Dashboard** screens to check status information about the UAG.

5.1.1 What You Can Do in this Chapter

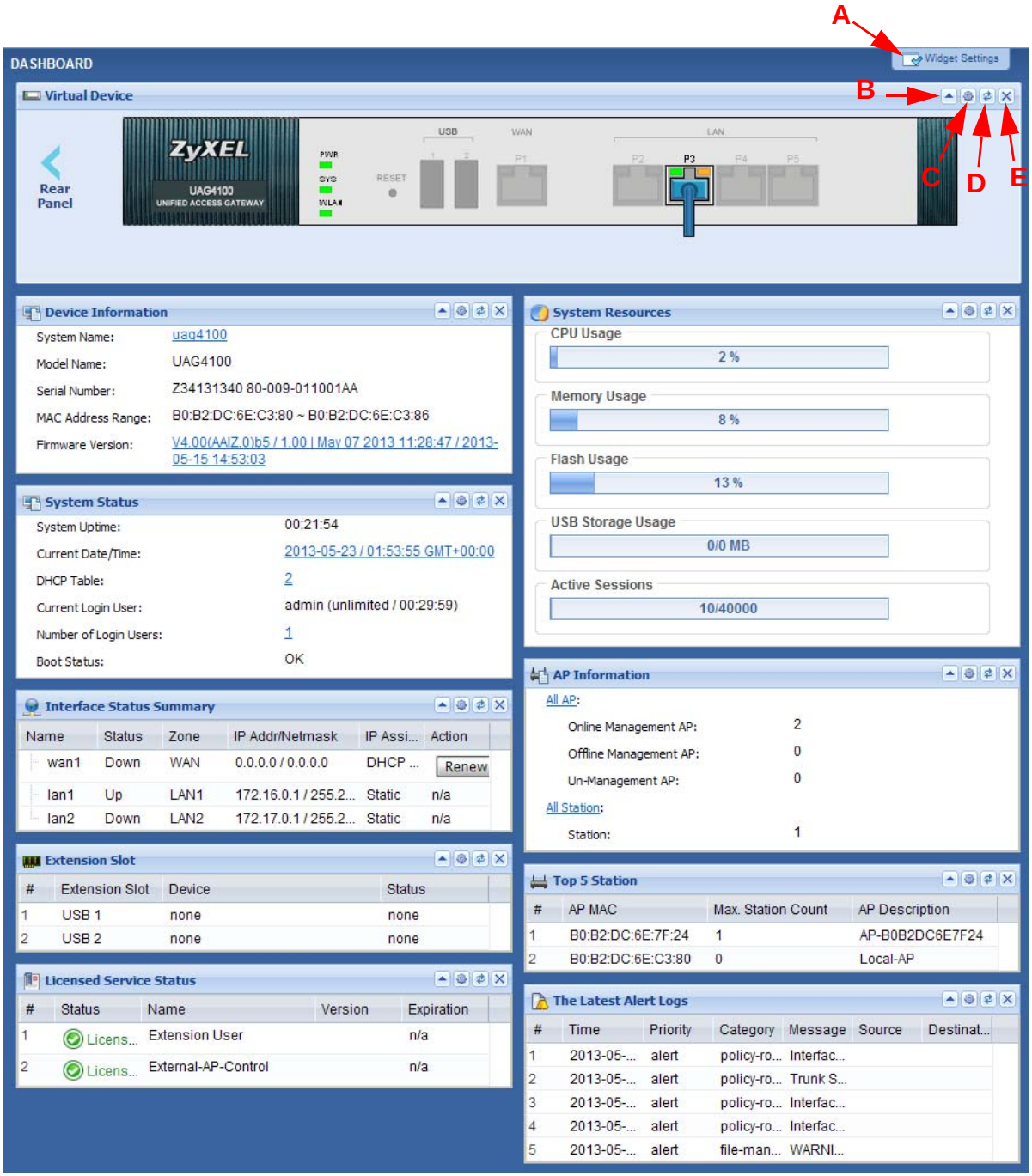
Use the **Dashboard** screens for the following.

- Use the main **Dashboard** screen (see Section 5.2 on page 49) to see the UAG's general device information, system status, system resource usage, licensed service status, and interface status. You can also display other status screens for more information.
- Use the **DHCP Table** screen (see Section 5.2.4 on page 56) to look at the IP addresses currently assigned to DHCP clients and the IP addresses reserved for specific MAC addresses.
- Use the **Number of Login Users** screen (see Section 5.2.5 on page 57) to look at a list of the users currently logged into the UAG.

5.2 The Dashboard Screen

The **Dashboard** screen displays when you log into the UAG or click **Dashboard** in the navigation panel. The dashboard displays general device information, system status, system resource usage, licensed service status, and interface status in widgets that you can re-arrange to suit your needs. You can also collapse, refresh, and close individual widgets.

Figure 33 Dashboard



The following table describes the labels in this screen.

Table 13 Dashboard

LABEL	DESCRIPTION
Widget Settings (A)	Use this link to open or close widgets by selecting/clearing the associated checkbox.
Up Arrow (B)	Click this to collapse a widget. It then becomes a down arrow. Click it again to enlarge the widget again.

Table 13 Dashboard (continued)

LABEL	DESCRIPTION
Refresh Time Setting (C)	Set the interval for refreshing the information displayed in the widget.
Refresh Now (D)	Click this to update the widget's information immediately.
Close Widget (E)	Click this to close the widget. Use **Widget Setting** to re-open it.
Virtual Device	Hover your cursor over a LED, connected slot or Ethernet port to view details about the status of the UAG's front panel LEDs and connections. See Section 2.2.1 on page 33 for LED descriptions. An unconnected interface or slot appears grayed out.
	The following labels display when you hover your cursor over an Ethernet port or USB port.
Name	This field displays the name of each interface.
Slot	This field displays the name of each extension slot.
Device	This field displays the name of the device connected to the USB port if one is connected.
Status	This field displays the current status of each interface or device installed in a slot. The possible values depend on what type of interface it is. **Inactive** - The Ethernet interface is disabled. **Down** - The Ethernet interface does not have any physical ports associated with it or the Ethernet interface is enabled but not connected. **Speed / Duplex** - The Ethernet interface is enabled and connected. This field displays the port speed and duplex setting (**Full** or **Half**). **Ready** - The USB port is connected.
Zone	This field displays the zone to which the interface is currently assigned.
IP Address/ Mask	This field displays the current IP address and subnet mask assigned to the interface.
Device Information	
System Name	This field displays the name used to identify the UAG on any network. Click the icon to open the screen where you can change it.
Model Name	This field displays the model name of this UAG.
Serial Number	This field displays the serial number of this UAG. The serial number is used for device tracking and control.
MAC Address Range	This field displays the MAC addresses used by the UAG. Each physical port has one MAC address. The first MAC address is assigned to physical port 1, the second MAC address is assigned to physical port 2, and so on.
Firmware Version	This field displays the version number and date of the firmware the UAG is currently running. Click the icon to open the screen where you can upload firmware.
System Status	
System Uptime	This field displays how long the UAG has been running since it last restarted or was turned on.
Current Date/Time	This field displays the current date and time in the UAG. The format is yyyy-mm-dd hh:mm:ss. Click the icon to open the screen where you can configure the UAG's date and time.
DHCP Table	Click this to look at the IP addresses currently assigned to the UAG's DHCP clients and the IP addresses reserved for specific MAC addresses. See Section 5.2.4 on page 56.
Current Login User	This field displays the user name used to log in to the current session, the amount of reauthentication time remaining, and the amount of lease time remaining.
Number of Login Users	This field displays the number of users currently logged in to the UAG. Click the icon to pop-open a list of the users who are currently logged in to the UAG.

Table 13 Dashboard (continued)

LABEL	DESCRIPTION
Boot Status	This field displays details about the UAG's startup state. **OK** - The UAG started up successfully. **Firmware update OK** - A firmware update was successful. **Problematic configuration after firmware update** - The application of the configuration failed after a firmware upgrade. **System default configuration** - The UAG successfully applied the system default configuration. This occurs when the UAG starts for the first time or you intentionally reset the UAG to the system default settings. **Fallback to lastgood configuration** - The UAG was unable to apply the startup-config.conf configuration file and fell back to the lastgood.conf configuration file. **Fallback to system default configuration** - The UAG was unable to apply the lastgood.conf configuration file and fell back to the system default configuration file (system-default.conf). **Booting in progress** - The UAG is still applying the system configuration.
Interface Status Summary	If an Ethernet interface does not have any physical ports associated with it, its entry is displayed in light gray text.
Name	This field displays the name of each interface.
Status	This field displays the current status of each interface. The possible values depend on what type of interface it is. For Ethernet interfaces: **Inactive** - The Ethernet interface is disabled. **Down** - The Ethernet interface does not have any physical ports associated with it or the Ethernet interface is enabled but not connected. **Up** - The Ethernet interface is enabled and connected. For PPP interfaces: **Connected** - The PPP interface is connected. **Disconnected** - The PPP interface is not connected. If the PPP interface is disabled, it does not appear in the list.
Zone	This field displays the zone to which the interface is currently assigned.
IP Addr/ Netmask	This field displays the current IP address and subnet mask assigned to the interface. If the IP address is 0.0.0.0/0.0.0.0, the interface is disabled or did not receive an IP address and subnet mask via DHCP. If this interface is a member of an active virtual router, this field displays the IP address it is currently using. This is either the static IP address of the interface (if it is the master) or the management IP address (if it is a backup).
IP Assignment	This field displays how the interface gets its IP address. **Static** - This interface has a static IP address. **DHCP Client** - This Ethernet interface gets its IP address from a DHCP server. **Dynamic** - This PPP interface gets its IP address from a DHCP server.

Table 13 Dashboard (continued)

LABEL	DESCRIPTION
Action	Use this field to get or to update the IP address for the interface. Click **Renew** to send a new DHCP request to a DHCP server. Click the **Connect** icon to have the UAG try to connect a PPPoE/PPTP interface. If the interface cannot use one of these ways to get or to update its IP address, this field displays **n/a**. Click the **Disconnect** icon to stop a PPPoE/PPTP connection.
Extension Slot	This section of the screen displays the status of the USB ports.
#	This field displays how many USB ports there are.
Extension Slot	This field displays the name of each extension slot.
Device	This field displays the name of the device connected to the extension slot (or **none** if no device is detected).
Status	**Ready** - A USB storage device connected to the UAG is ready for the UAG to use. **none** - The UAG is unable to mount a USB storage device connected to the UAG.
Licensed Service Status	
#	This shows how many licensed services there are.
Status	This is the current status of the license.
Name	This identifies the licensed service.
Version	This is the version number of the service.
Expiration	If the service license is valid, this shows when it will expire. **n/a** displays if the service license does not have a limited period of validity. **0** displays if the service is not licensed or has expired.
System Resources	
CPU Usage	This field displays what percentage of the UAG's processing capability is currently being used. Hover your cursor over this field to display the **Show CPU Usage** icon that takes you to a chart of the UAG's recent CPU usage.
Memory Usage	This field displays what percentage of the UAG's RAM is currently being used. Hover your cursor over this field to display the **Show Memory Usage** icon that takes you to a chart of the UAG's recent memory usage.
Flash Usage	This field displays what percentage of the UAG's onboard flash memory is currently being used.
USB Storage Usage	This field shows how much storage in the USB device connected to the UAG is in use.
Active Sessions	This field displays how many traffic sessions are currently open on the UAG. These are all sessions, established and non-established, that pass through/from/to/within the UAG. Hover your cursor over this field to display icons. Click the **Detail** icon to go to the **Session Monitor** screen to see details about the active sessions. Click the **Show Active Sessions** icon to display a chart of UAG's recent session usage.
AP Information	This shows a summary of connected wireless Access Points (APs).
All AP	This section displays a summary for all connected wireless APs. Click the link to go to the **AP information** > **AP List** screen.
Online Management AP	This displays the number of currently connected management APs.
Offline Management AP	This displays the number of currently offline managed APs.

Table 13 Dashboard (continued)

LABEL	DESCRIPTION
Un-Management AP	This displays the number of non-managed APs.
All Station	This section displays a summary of connected stations. Click the link to go to the **Station Info** > **Station List** screen.
Station	This displays the number of stations currently connected to the network.
Top 5 Station	Displays the top 5 Access Points (AP) with the highest number of station (aka wireless client) connections.
#	This field displays the rank of the station.
AP MAC	This field displays the MAC address of the AP to which the station belongs.
Max. Station Count	This field displays the maximum number of wireless clients that have connected to this AP.
AP Description	This field displays the AP's description. The default description is "AP-" followed by the AP's MAC address.
The Latest Alert Logs	This section of the screen displays recent logs generated by the UAG.
#	This is the entry's rank in the list of alert logs.
Time	This field displays the date and time the log was created.
Priority	This field displays the severity of the log.
Category	This field displays the type of log generated.
Message	This field displays the actual log message.
Source	This field displays the source address (if any) in the packet that generated the log.
Destination	This field displays the destination address (if any) in the packet that generated the log.

5.2.1 The CPU Usage Screen

Use this screen to look at a chart of the UAG's recent CPU usage. To access this screen, click **CPU Usage** in the dashboard.

Figure 34 Dashboard > CPU Usage

The following table describes the labels in this screen.

Table 14 Dashboard > CPU Usage

LABEL	DESCRIPTION
	The y-axis represents the percentage of CPU usage.
	The x-axis shows the time period over which the CPU usage occurred
Refresh Interval	Enter how often you want this window to be automatically updated.
Refresh Now	Click this to update the information in the window right away.

5.2.2 The Memory Usage Screen

Use this screen to look at a chart of the UAG's recent memory (RAM) usage. To access this screen, click **Memory Usage** in the dashboard.

Figure 35 Dashboard > Memory Usage

The following table describes the labels in this screen.

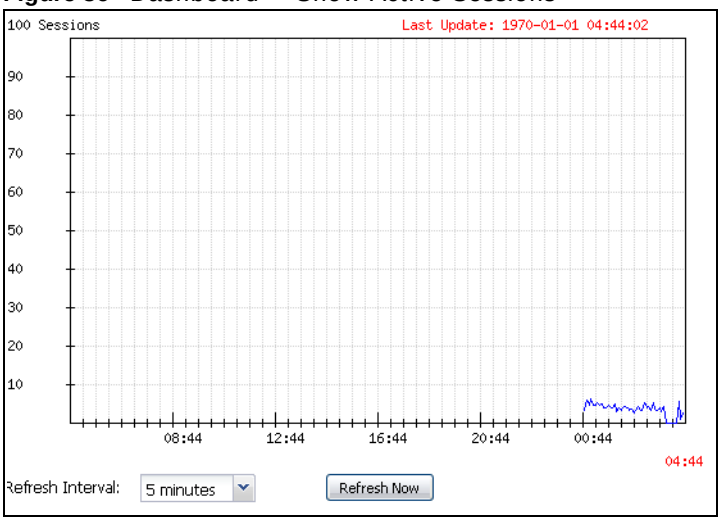
Table 15 Dashboard > Memory Usage

LABEL	DESCRIPTION
	The y-axis represents the percentage of RAM usage.
	The x-axis shows the time period over which the RAM usage occurred
Refresh Interval	Enter how often you want this window to be automatically updated.
Refresh Now	Click this to update the information in the window right away.

5.2.3 The Active Sessions Screen

Use this screen to look at a chart of the UAG's recent traffic session usage. To access this screen, click **Show Active Sessions** in the dashboard.

Figure 36 Dashboard > Show Active Sessions



The following table describes the labels in this screen.

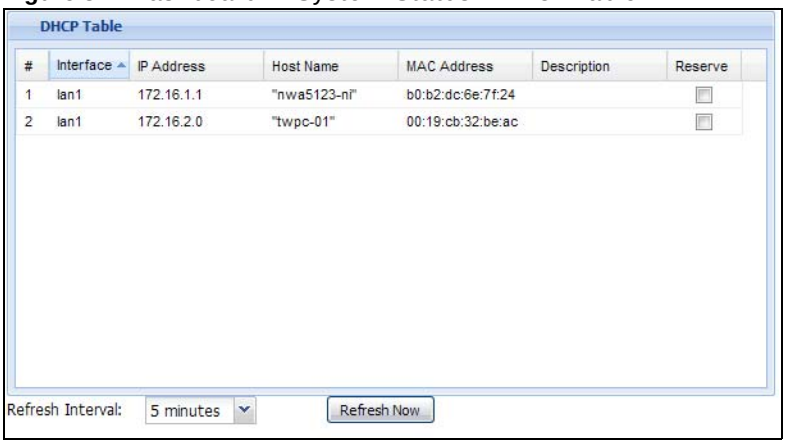
Table 16 Dashboard > Show Active Sessions

LABEL	DESCRIPTION
Sessions	The y-axis represents the number of session.
	The x-axis shows the time period over which the session usage occurred
Refresh Interval	Enter how often you want this window to be automatically updated.
Refresh Now	Click this to update the information in the window right away.

5.2.4 The DHCP Table Screen

Use this screen to look at the IP addresses currently assigned to DHCP clients and the IP addresses reserved for specific MAC addresses. To access this screen, click **DHCP Table** in **System Status** in the dashboard.

Figure 37 Dashboard > System Status >DHCP Table



The following table describes the labels in this screen.

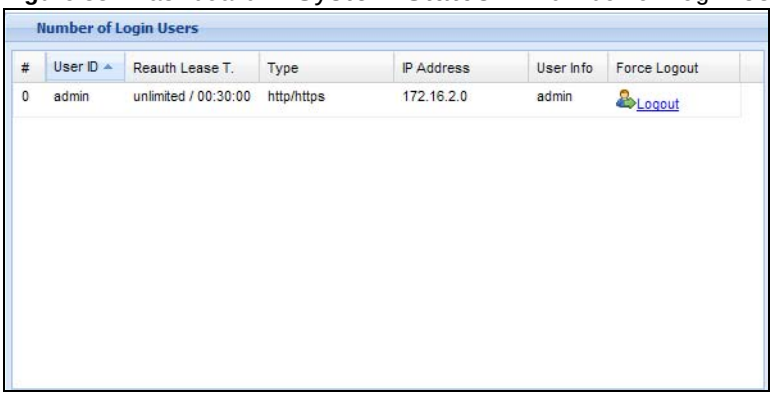
Table 17 Dashboard > DHCP Table

LABEL	DESCRIPTION
#	This field is a sequential value, and it is not associated with a specific entry.
Interface	This field identifies the interface that assigned an IP address to a DHCP client.
IP Address	This field displays the IP address currently assigned to a DHCP client or reserved for a specific MAC address. Click the column's heading cell to sort the table entries by IP address. Click the heading cell again to reverse the sort order.
Host Name	This field displays the name used to identify this device on the network (the computer name). The UAG learns these from the DHCP client requests. "None" shows here for a static DHCP entry.
MAC Address	This field displays the MAC address to which the IP address is currently assigned or for which the IP address is reserved. Click the column's heading cell to sort the table entries by MAC address. Click the heading cell again to reverse the sort order.
Description	For a static DHCP entry, the host name or the description you configured shows here. This field is blank for dynamic DHCP entries.
Reserve	If this field is selected, this entry is a static DHCP entry. The IP address is reserved for the MAC address. If this field is clear, this entry is a dynamic DHCP entry. The IP address is assigned to a DHCP client. To create a static DHCP entry using an existing dynamic DHCP entry, select this field. To remove a static DHCP entry, clear this field.
Refresh Interval	Enter how often you want this window to be automatically updated.
Refresh Now	Click this to update the information in the window right away.

5.2.5 The Number of Login Users Screen

Use this screen to look at a list of the users currently logged into the UAG. Users who close their browsers without logging out are still shown as logged in here. To access this screen, click **Number of Login Users** in **System Status** in the dashboard.

Figure 38 Dashboard > System Status > Number of Login Users



The following table describes the labels in this screen.

Table 18 Dashboard > Number of Login Users

LABEL	DESCRIPTION
#	This field is a sequential value and is not associated with any entry.
User ID	This field displays the user name of each user who is currently logged in to the UAG.
Reauth Lease T.	This field displays the amount of reauthentication time remaining and the amount of lease time remaining for each user. See Chapter 30 on page 275 for more information.
Type	This field displays the way the user logged in to the UAG.
IP address	This field displays the IP address of the computer used to log in to the UAG.
User Info	This field displays the types of user accounts the UAG uses. If the user type is **ext-user** (external user), this field will show its external-group information when you move your mouse over it. If the external user matches two external-group objects, both external-group object names will be shown.
Force Logout	Click this icon to end a user's session.

6

Monitor

6.1 Overview

Use the **Monitor** screens to check status and statistics information.

6.1.1 What You Can Do in this Chapter

Use the **Monitor** screens for the following.

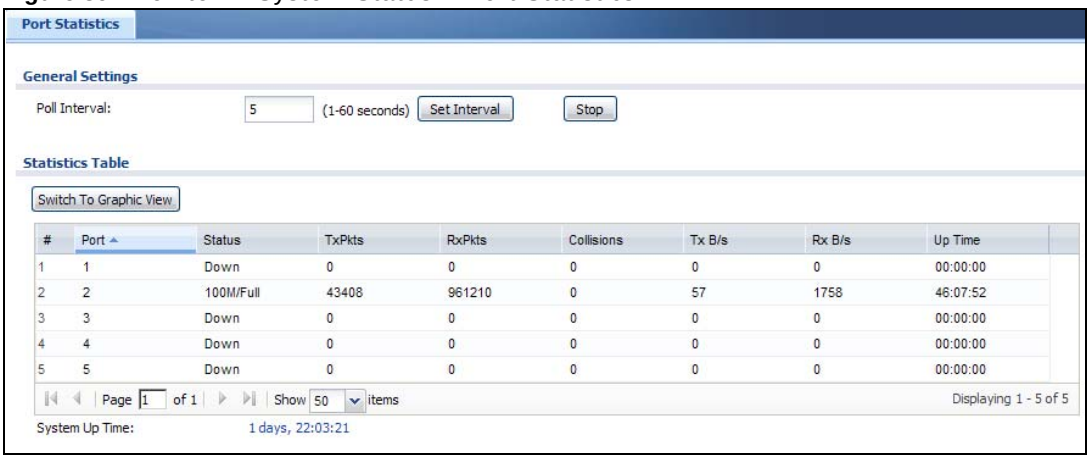
- Use the **System Status > Port Statistics** screen (see Section 6.2 on page 60) to look at packet statistics for each physical port.
- Use the **System Status > Port Statistics > Graph View** screen (see Section 6.2 on page 60) to look at a line graph of packet statistics for each physical port.
- Use the **System Status > Interface Status** screen (see Section 6.3 on page 62) to see all of the UAG's interfaces and their packet statistics.
- Use the **System Status > Traffic Statistics** screen (see Section 6.4 on page 64) to start or stop data collection and view statistics.
- Use the **System Status > Session Monitor** screen (see Section 6.5 on page 66) to view sessions by user or service.
- Use the **System Status > DDNS Status** screen (see Section 6.6 on page 68) to view the status of the UAG's DDNS domain names.
- Use the **System Status > IP/MAC Binding** screen (see Section 6.7 on page 69) to view a list of devices that have received an IP address from UAG interfaces with IP/MAC binding enabled.
- Use the **System Status > Login Users** screen (see Section 6.8 on page 70) to look at a list of the users currently logged into the UAG.
- Use the **System Status > UPnP Port Status** screen (see Section 6.9 on page 71) to look at a list of the NAT port mapping rules that UPnP creates on the UAG.
- Use the **System Status > USB Storage** screen (see Section 6.10 on page 72) to view information about a connected USB storage device.
- Use the **System Status > Dynamic Guest** screen (see Section 6.11 on page 73) to look at a list of the guest user accounts, which are created automatically and allowed to access the UAG's services for a certain period of time.
- Use the **AP Information** > **AP List** screen (see Section 6.12 on page 75) to view which APs are currently connected to the UAG.
- Use the **AP Information > Radio List** screen (see Section 6.13 on page 77) to view statistics about the wireless radio transmitters in each of the APs connected to the UAG.
- Use the **Station Info** > **Station List** screen (see Section 6.14 on page 80) to view statistics pertaining to the connected stations (or "wireless clients").
- Use the **Printer Status** screen (see Section 6.15 on page 81) to view information about the connected statement printers.

- Use the **VPN 1-1 Mapping** screen (see Section 6.16 on page 82) to view the status of the active users to which the UAG applied a VPN 1-1 mapping rule.
- Use the **VPN 1-1 Mapping > Statistics** screen (see Section 6.16.1 on page 83) to display statistics for each of the VPN 1-1 mapping rules.
- Use the **Log > View Log** screen (see Section 6.17 on page 83) to view the UAG's current log messages. You can change the way the log is displayed, you can e-mail the log, and you can also clear the log in this screen.
- Use the **Log > View AP Log** screen (see Section 6.17.1 on page 86) to view the UAG's current wireless AP log messages.
- Use the **Log > Dynamic Users Log** screen (see Section 6.17.2 on page 88) to view the UAG's dynamic guest account log messages.

6.2 The Port Statistics Screen

Use this screen to look at packet statistics for each Gigabit Ethernet port. To access this screen, click **Monitor > System Status** > **Port Statistics**.

Figure 39 Monitor > System Status > Port Statistics



The following table describes the labels in this screen.

Table 19 Monitor > System Status > Port Statistics

LABEL	DESCRIPTION
Poll Interval	Enter how often you want this window to be updated automatically, and click **Set Interval**.
Set Interval	Click this to set the **Poll Interval** the screen uses.
Stop	Click this to stop the window from updating automatically. You can start it again by setting the **Poll Interval** and clicking **Set Interval**.
Switch to Graphic View	Click this to display the port statistics as a line graph.
#	This field displays the port's number in the list.
Port	This field displays the physical port number.

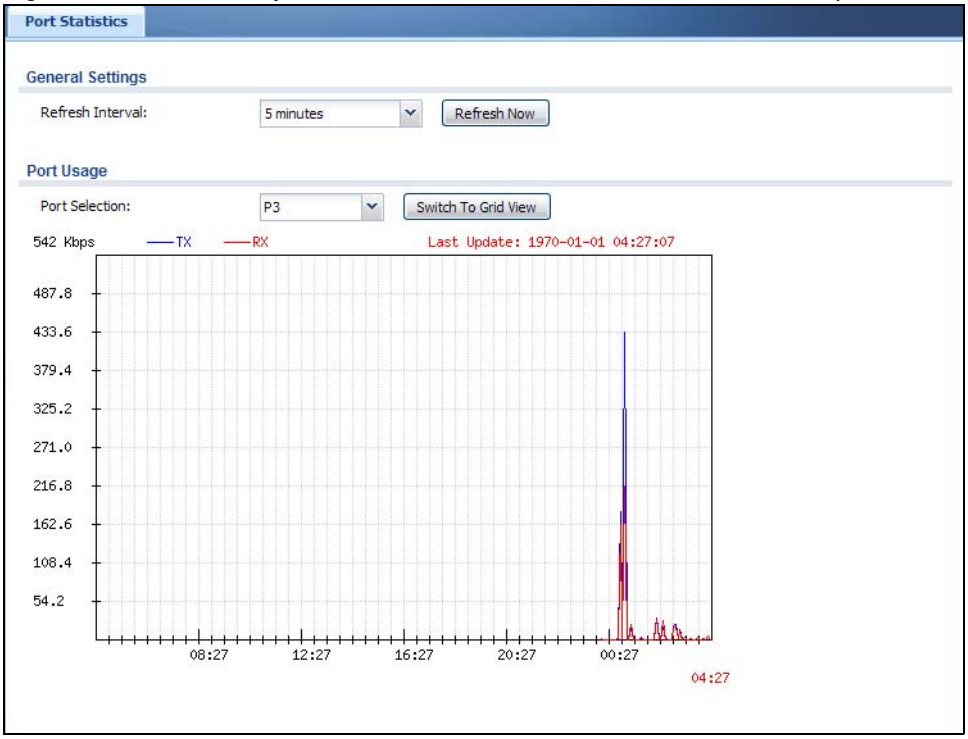
Table 19 Monitor > System Status > Port Statistics (continued)

LABEL	DESCRIPTION
Status	This field displays the current status of the physical port. **Down** - The physical port is not connected. **Speed / Duplex** - The physical port is connected. This field displays the port speed and duplex setting (**Full** or **Half**).
TxPkts	This field displays the number of packets transmitted from the UAG on the physical port since it was last connected.
RxPkts	This field displays the number of packets received by the UAG on the physical port since it was last connected.
Collisions	This field displays the number of collisions on the physical port since it was last connected.
Tx B/s	This field displays the transmission speed, in bytes per second, on the physical port in the one-second interval before the screen updated.
Rx B/s	This field displays the reception speed, in bytes per second, on the physical port in the one-second interval before the screen updated.
Up Time	This field displays how long the physical port has been connected.
System Up Time	This field displays how long the UAG has been running since it last restarted or was turned on.

6.2.1 The Port Statistics Graph Screen

Use this screen to look at a line graph of packet statistics for each physical port. To access this screen, click **Port Statistics** in the **Status** screen and then the **Switch to Graphic View** Button.

Figure 40 Monitor > System Status > Port Statistics > Switch to Graphic View



The following table describes the labels in this screen.

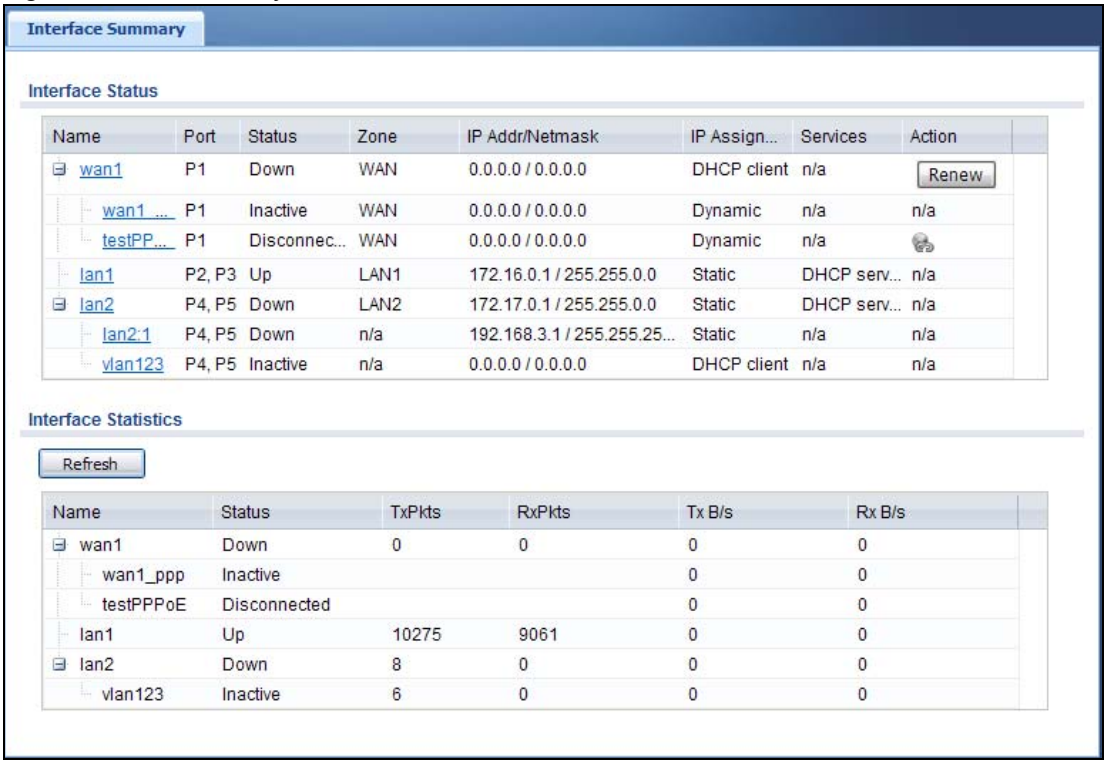
Table 20 Monitor > System Status > Port Statistics > Switch to Graphic View

LABEL	DESCRIPTION
Refresh Interval	Enter how often you want this window to be automatically updated.
Refresh Now	Click this to update the information in the window right away.
Port Selection	Select the number of the physical port for which you want to display graphics.
Switch to Grid View	Click this to display the port statistics as a table.
Kbps	The y-axis represents the speed of transmission or reception.
time	The x-axis shows the time period over which the transmission or reception occurred
TX	This line represents traffic transmitted from the UAG on the physical port since it was last connected.
RX	This line represents the traffic received by the UAG on the physical port since it was last connected.
Last Update	This field displays the date and time the information in the window was last updated.
System Up Time	This field displays how long the UAG has been running since it last restarted or was turned on.

6.3 The Interface Status Screen

This screen lists all of the UAG's interfaces and gives packet statistics for them. Click **Monitor > System Status > Interface Status** to access this screen.

Figure 41 Monitor > System Status > Interface Status



Each field is described in the following table.

Table 21 Monitor > System Status > Interface Status

LABEL	DESCRIPTION
Interface Status	If an Ethernet interface does not have any physical ports associated with it, its entry is displayed in light gray text.
Expand/Close	Click this button to show or hide statistics for all the virtual interfaces on top of the Ethernet interfaces.
Name	This field displays the name of each interface. If there is an **Expand** icon (plus-sign) next to the name, click this to look at the status of virtual interfaces on top of this interface.
Port	This field displays the physical port number.
Status	This field displays the current status of each interface. The possible values depend on what type of interface it is. For Ethernet interfaces: • **Inactive** - The Ethernet interface is disabled. • **Down** - The Ethernet interface does not have any physical ports associated with it or the Ethernet interface is enabled but not connected. • **Up** - The LAN Ethernet interface is enabled and connected. • **Speed / Duplex** - The WAN Ethernet interface is enabled and connected. This field displays the port speed and duplex setting (**Full** or **Half**). For virtual interfaces, this field always displays **Up** or **Down**. If the virtual interface is disabled, it displays **Inactive**. For VLAN and bridge interfaces, this field always displays **Up** or **Down**. If the VLAN or bridge interface is disabled, it displays **Inactive**. For PPP interfaces: • **Inactive** - The PPP interface is disabled. • **Connected** - The PPP interface is connected. • **Disconnected** - The PPP interface is not connected.
Zone	This field displays the zone to which the interface is assigned.
IP Addr/Netmask	This field displays the current IP address and subnet mask assigned to the interface. If the IP address and subnet mask are 0.0.0.0, the interface is disabled or did not receive an IP address and subnet mask via DHCP.
IP Assignment	This field displays how the interface gets its IP address. **Static** - This interface has a static IP address. **DHCP Client** - This interface gets its IP address from a DHCP server.
Services	This field lists which services the interface provides to the network. Examples include **DHCP relay**, and **DHCP server**. This field displays **n/a** if the interface does not provide any services to the network.
Action	Use this field to get or to update the IP address for the interface. Click **Renew** to send a new DHCP request to a DHCP server. Click **Connect** to try to connect a PPPoE/PPTP interface. If the interface cannot use one of these ways to get or to update its IP address, this field displays **n/a**.
Interface Statistics	This table provides packet statistics for each interface.
Refresh	Click this button to update the information in the screen.
Expand/Close	Click this button to show or hide statistics for all the virtual interfaces on top of the Ethernet interfaces.
Name	This field displays the name of each interface. If there is a **Expand** icon (plus-sign) next to the name, click this to look at the statistics for virtual interfaces on top of this interface.

Table 21 Monitor > System Status > Interface Status (continued)

LABEL	DESCRIPTION
Status	This field displays the current status of each interface. The possible values depend on what type of interface it is. For Ethernet interfaces: • **Inactive** - The Ethernet interface is disabled. • **Down** - The Ethernet interface does not have any physical ports associated with it or the Ethernet interface is enabled but not connected. • **Up** - The LAN Ethernet interface is enabled and connected. • **Speed / Duplex** - The WAN Ethernet interface is enabled and connected. This field displays the port speed and duplex setting (**Full** or **Half**). For virtual interfaces, this field always displays **Up** or **Down**. If the virtual interface is disabled, it displays **Inactive**. For VLAN and bridge interfaces, this field always displays **Up** or **Down**. If the VLAN or bridge interface is disabled, it displays **Inactive**. For PPP interfaces: • **Inactive** - The PPP interface is disabled. • **Connected** - The PPP interface is connected. • **Disconnected** - The PPP interface is not connected.
TxPkts	This field displays the number of packets transmitted from the UAG on the interface since it was last connected.
RxPkts	This field displays the number of packets received by the UAG on the interface since it was last connected.
Tx B/s	This field displays the transmission speed, in bytes per second, on the interface in the one-second interval before the screen updated.
Rx B/s	This field displays the reception speed, in bytes per second, on the interface in the one-second interval before the screen updated.

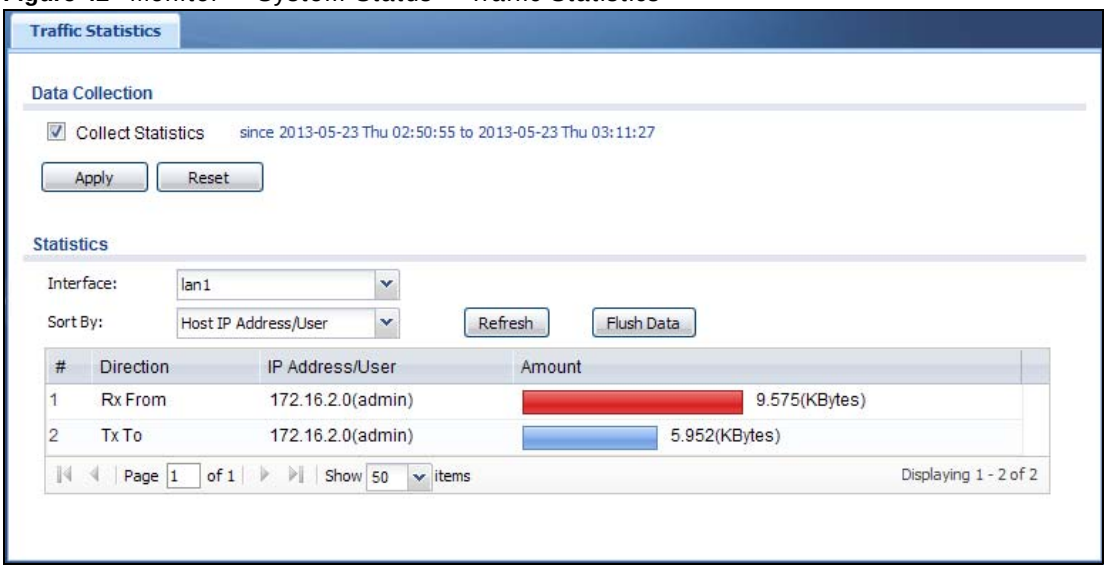
6.4 The Traffic Statistics Screen

Click **Monitor > System Status > Traffic Statistics** to display the **Traffic Statistics** screen. This screen provides basic information about the following for example:

- Most-visited Web sites and the number of times each one was visited. This count may not be accurate in some cases because the UAG counts HTTP GET packets. Please see Table 22 on page 65 for more information.
- Most-used protocols or service ports and the amount of traffic on each one
- LAN IP with heaviest traffic and how much traffic has been sent to and from each one

You use the **Traffic Statistics** screen to tell the UAG when to start and when to stop collecting information for these reports. You cannot schedule data collection; you have to start and stop it manually in the **Traffic Statistics** screen.

Figure 42 Monitor > System Status > Traffic Statistics



There is a limit on the number of records shown in the report. Please see Table 23 on page 66 for more information. The following table describes the labels in this screen.

Table 22 Monitor > System Status > Traffic Statistics

LABEL	DESCRIPTION
Data Collection	
Collect Statistics	Select this to have the UAG collect data for the report. If the UAG has already been collecting data, the collection period displays to the right. The progress is not tracked here real-time, but you can click the **Refresh** button to update it.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.
Statistics	
Interface	Select the interface from which to collect information. You can collect information from Ethernet, VLAN, bridge and PPPoE/PPTP interfaces.
Top	Select the type of report to display. Choices are: **Host IP Address/User** - displays the IP addresses or users with the most traffic and how much traffic has been sent to and from each one. **Service/Port** - displays the most-used protocols or service ports and the amount of traffic for each one. **Web Site Hits** - displays the most-visited Web sites and how many times each one has been visited. Each type of report has different information in the report (below).
Refresh	Click this button to update the report display.
Flush Data	Click this button to discard all of the screen's statistics and update the report display.
	These fields are available when the **Top** is **Host IP Address/User**.
#	This field is the rank of each record. The IP addresses and users are sorted by the amount of traffic.
Direction	This field indicates whether the IP address or user is sending or receiving traffic. **RX From**- traffic is coming from the IP address or user to the UAG. **Tx To** - traffic is going from the UAG to the IP address or user.

Table 22 Monitor > System Status > Traffic Statistics (continued)

LABEL	DESCRIPTION
IP Address/User	This field displays the IP address or user in this record. The maximum number of IP addresses or users in this report is indicated in Table 23 on page 66.
Amount	This field displays how much traffic was sent or received from the indicated IP address or user. If the **Direction** is **RX From**, a red bar is displayed; if the **Direction** is **Tx To**, a blue bar is displayed. The unit of measure is bytes, Kbytes, Mbytes or Gbytes, depending on the amount of traffic for the particular IP address or user. The count starts over at zero if the number of bytes passes the byte count limit. See Table 23 on page 66.
	These fields are available when the **Top** is **Service / Port**.
#	This field is the rank of each record. The protocols and service ports are sorted by the amount of traffic.
Service/Port	This field displays the service and port in this record. The maximum number of services and service ports in this report is indicated in Table 23 on page 66.
Protocol	This field indicates what protocol the service was using.
Direction	This field indicates whether the indicated protocol or service port is sending or receiving traffic. **Ingress** - traffic is coming into the router through the interface **Egress** - traffic is going out from the router through the interface
Amount	This field displays how much traffic was sent or received from the indicated service / port. If the **Direction** is **Ingress**, a red bar is displayed; if the **Direction** is **Egress**, a blue bar is displayed. The unit of measure is bytes, Kbytes, Mbytes, Gbytes, or Tbytes, depending on the amount of traffic for the particular protocol or service port. The count starts over at zero if the number of bytes passes the byte count limit. See Table 23 on page 66.
	These fields are available when the **Top** is **Web Site Hits**.
#	This field is the rank of each record. The domain names are sorted by the number of hits.
Web Site	This field displays the domain names most often visited. The UAG counts each page viewed on a Web site as another hit. The maximum number of domain names in this report is indicated in Table 23 on page 66.
Hits	This field displays how many hits the Web site received. The UAG counts hits by counting HTTP GET packets. Many Web sites have HTTP GET references to other Web sites, and the UAG counts these as hits too. The count starts over at zero if the number of hits passes the hit count limit. See Table 23 on page 66.

The following table displays the maximum number of records shown in the report, the byte count limit, and the hit count limit.

Table 23 Maximum Values for Reports

LABEL	DESCRIPTION
Maximum Number of Records	20
Byte Count Limit	2^{64} bytes; this is just less than 17 million terabytes.
Hit Count Limit	2^{64} hits; this is over 1.8 x 10^{19} hits.

6.5 The Session Monitor Screen

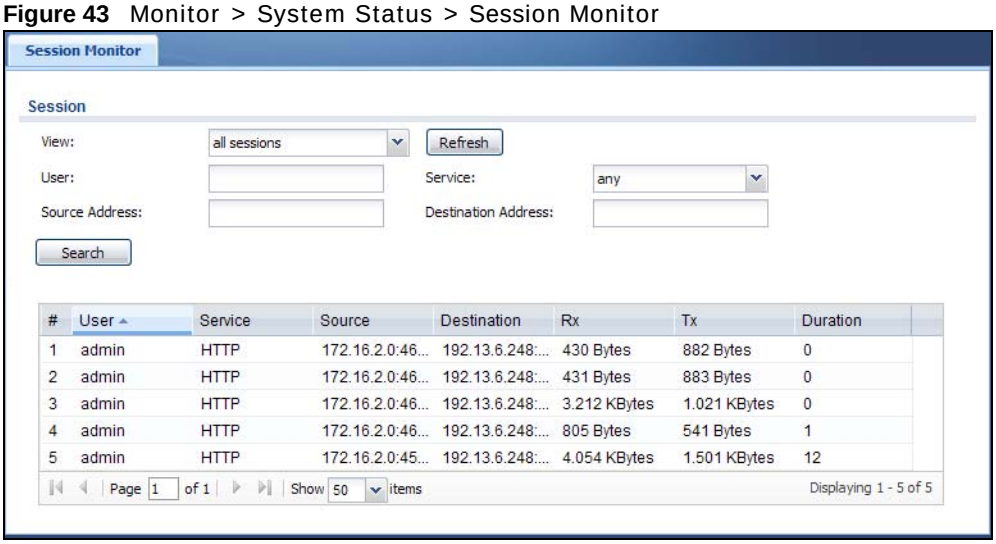
The **Session Monitor** screen displays information about all established sessions that pass through the UAG for debugging or statistical analysis. It is not possible to manage sessions in this screen. The following information is displayed.

- User who started the session
- Protocol or service port used
- Source address
- Destination address
- Number of bytes received (so far)
- Number of bytes transmitted (so far)
- Duration (so far)

You can look at all the active sessions by user, service, source IP address, or destination IP address. You can also filter the information by user, protocol / service or service group, source address, and/or destination address and view it by user.

Click **Monitor > System Status > Session Monitor** to display the following screen.

Figure 43 Monitor > System Status > Session Monitor



The following table describes the labels in this screen.

Table 24 Monitor > System Status > Session Monitor

LABEL	DESCRIPTION
View	Select how you want the information to be displayed. Choices are: **sessions by users** - display all active sessions grouped by user. **sessions by services** - display all active sessions grouped by service or protocol. **sessions by source IP** - display all active sessions grouped by source IP address. **sessions by destination IP** - display all active sessions grouped by destination IP address. **all sessions** - filter the active sessions by the **User**, **Service**, **Source Address**, and **Destination Address**, and display each session individually (sorted by user).
Refresh	Click this button to update the information on the screen. The screen also refreshes automatically when you open and close the screen.
	The **User**, **Service**, **Source Address**, and **Destination Address** fields display if you view all sessions. Select your desired filter criteria and click the **Search** button to filter the list of sessions.

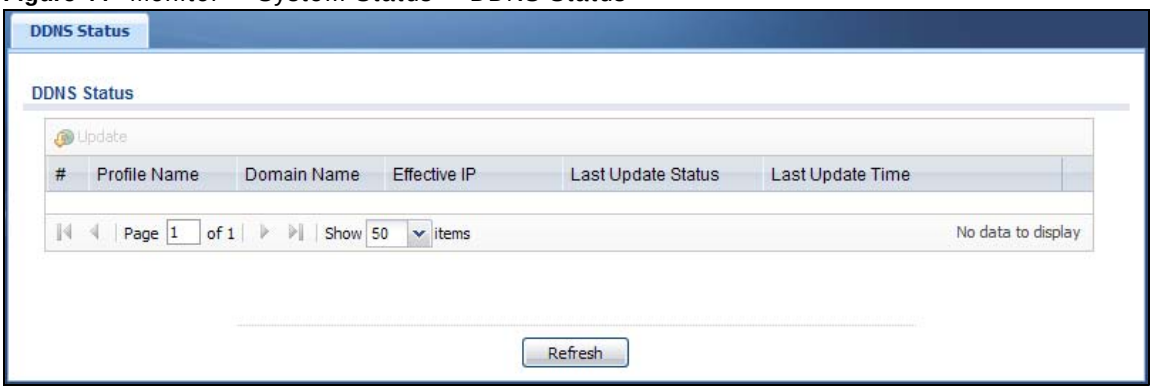
Table 24 Monitor > System Status > Session Monitor (continued)

LABEL	DESCRIPTION
User	This field displays when **View** is set to **all sessions**. Type the user whose sessions you want to view. It is not possible to type part of the user name or use wildcards in this field; you must enter the whole user name.
Service	This field displays when **View** is set to **all sessions**. Select the service or service group whose sessions you want to view. The UAG identifies the service by comparing the protocol and destination port of each packet to the protocol and port of each services that is defined. (See Chapter 33 on page 309 for more information about services.)
Source	This field displays when **View** is set to **all sessions**. Type the source IP address whose sessions you want to view. You cannot include the source port.
Destination	This field displays when **View** is set to **all sessions**. Type the destination IP address whose sessions you want to view. You cannot include the destination port.
Search	This button displays when **View** is set to **all sessions**. Click this button to update the information on the screen using the filter criteria in the **User**, **Service**, **Source Address**, and **Destination Address** fields.
Active Sessions	This is the total number of active sessions that matched the search criteria.
Show	Select the number of active sessions displayed on each page. You can use the arrow keys on the right to change pages.
User	This field displays the user in each active session. If you are looking at the **sessions by users** (or **all sessions**) report, click **+** or **-** to display or hide details about a user's sessions.
Service	This field displays the protocol used in each active session. If you are looking at the **sessions by services** report, click **+** or **-** to display or hide details about a protocol's sessions.
Source	This field displays the source IP address and port in each active session. If you are looking at the **sessions by source IP** report, click **+** or **-** to display or hide details about a source IP address's sessions.
Destination	This field displays the destination IP address and port in each active session. If you are looking at the **sessions by destination IP** report, click **+** or **-** to display or hide details about a destination IP address's sessions.
Rx	This field displays the amount of information received by the source in the active session.
Tx	This field displays the amount of information transmitted by the source in the active session.
Duration	This field displays the length of the active session in seconds.

6.6 The DDNS Status Screen

The **DDNS Status** screen shows the status of the UAG's DDNS domain names. Click **Monitor > System Status > DDNS Status** to open the following screen.

Figure 44 Monitor > System Status > DDNS Status



The following table describes the labels in this screen.

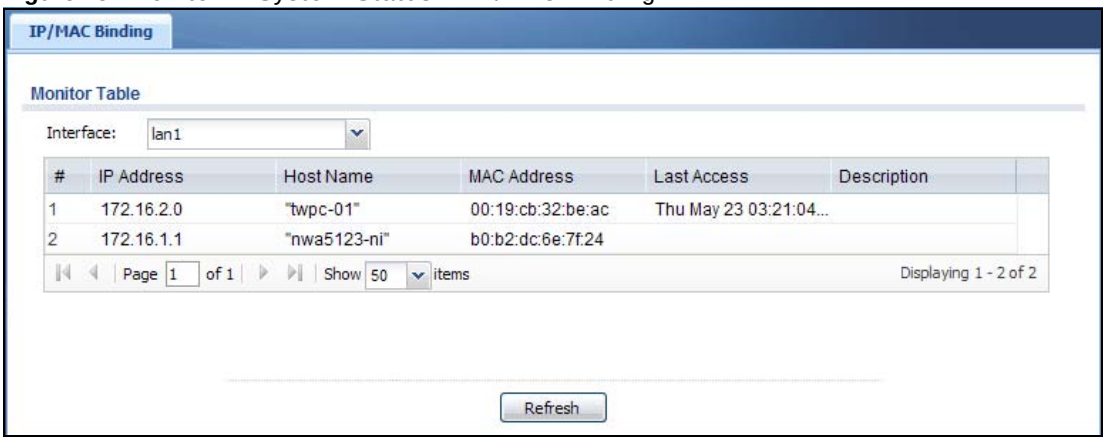
Table 25 Monitor > System Status > DDNS Status

LABEL	DESCRIPTION
Update	Click this to have the UAG update the profile to the DDNS server. The UAG attempts to resolve the IP address for the domain name.
Profile Name	This field displays the descriptive profile name for this entry.
Domain Name	This field displays each domain name the UAG can route.
Effective IP	This is the (resolved) IP address of the domain name.
Last Update Status	This shows whether the last attempt to resolve the IP address for the domain name was successful or not. **Updating** means the UAG is currently attempting to resolve the IP address for the domain name.
Last Update Time	This shows when the last attempt to resolve the IP address for the domain name occurred (in year-month-day hour:minute:second format).

6.7 The IP/MAC Binding Monitor Screen

Click **Monitor > System Status > IP/MAC Binding** to open the **IP/MAC Binding Monitor** screen. This screen lists the devices that have received an IP address from UAG interfaces with IP/MAC binding enabled and have ever established a session with the UAG. Devices that have never established a session with the UAG do not display in the list.

Figure 45 Monitor > System Status > IP/MAC Binding



The following table describes the labels in this screen.

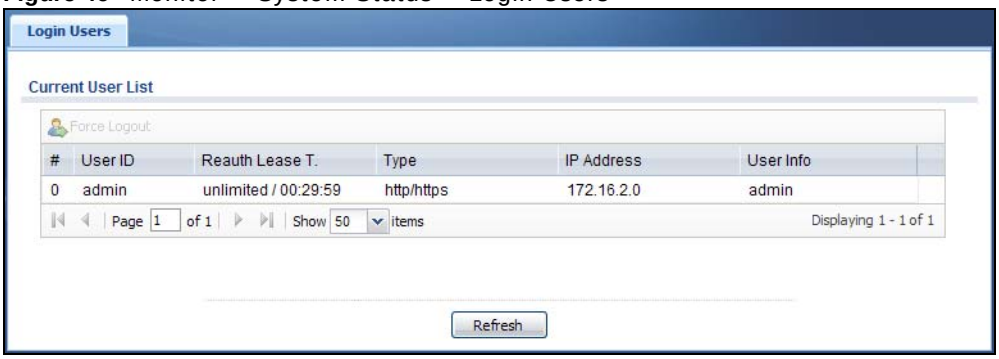
Table 26 Monitor > System Status > IP/MAC Binding

LABEL	DESCRIPTION
Interface	Select a UAG interface that has IP/MAC binding enabled to show to which devices it has assigned an IP address.
#	This is the index number of an IP/MAC binding entry.
IP Address	This is the IP address that the UAG assigned to a device.
Host Name	This field displays the name used to identify this device on the network (the computer name). The UAG learns these from the DHCP client requests.
MAC Address	This field displays the MAC address to which the IP address is currently assigned.
Last Access	This is when the device last established a session with the UAG through this interface.
Description	This field displays the descriptive name that helps identify the entry.
Refresh	Click this button to update the information in the screen.

6.8 The Login Users Screen

Use this screen to look at a list of the users currently logged into the UAG. To access this screen, click **Monitor > System Status > Login Users**.

Figure 46 Monitor > System Status > Login Users



The following table describes the labels in this screen.

Table 27 Monitor > System Status > Login Users

LABEL	DESCRIPTION
Force Logout	Select a user ID and click this icon to end a user's session.
#	This field is a sequential value and is not associated with any entry.
User ID	This field displays the user name of each user who is currently logged in to the UAG.
Reauth Lease T.	This field displays the amount of reauthentication time remaining and the amount of lease time remaining for each user. See Chapter 30 on page 275.
Type	This field displays the way the user logged in to the UAG.
IP Address	This field displays the IP address of the computer used to log in to the UAG.

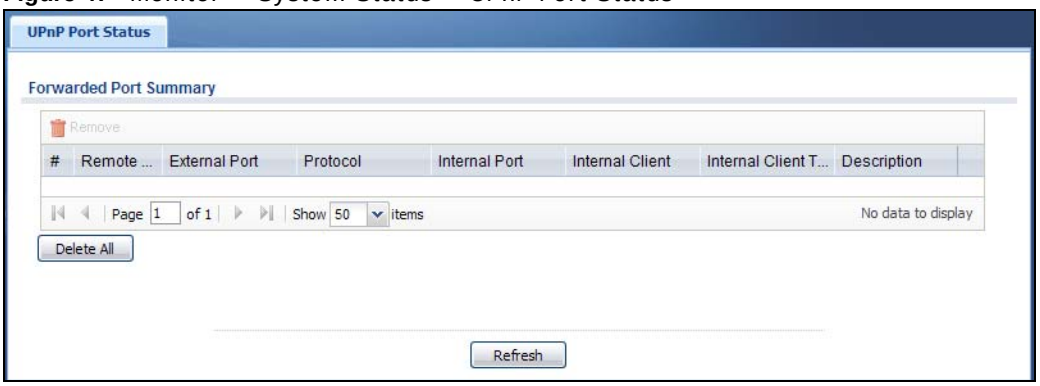
Table 27 Monitor > System Status > Login Users (continued)

LABEL	DESCRIPTION
User Info	This field displays the types of user accounts the UAG uses. If the user type is **ext-user** (external user), this field will show its external-group information when you move your mouse over it. If the external user matches two external-group objects, both external-group object names will be shown.
Force Logout	Select a user ID and click this icon to end a user's session.
Refresh	Click this button to update the information in the screen.

6.9 The UPnP Port Status Screen

Use this screen to look at the NAT port mapping rules that UPnP creates on the UAG. To access this screen, click **Monitor > System Status > UPnP Port Status**.

Figure 47 Monitor > System Status > UPnP Port Status



The following table describes the labels in this screen.

Table 28 Monitor > System Status > UPnP Port Status

LABEL	DESCRIPTION
Remove	Select an entry and click this button to remove it from the list.
#	This is the index number of the UPnP-created NAT mapping rule entry.
Remote Host	This field displays the source IP address (on the WAN) of inbound IP packets. Since this is often a wildcard, the field may be blank. When the field is blank, the UAG forwards all traffic sent to the **External Port** on the WAN interface to the **Internal Client** on the **Internal Port**. When this field displays an external IP address, the NAT rule has the UAG forward inbound packets to the **Internal Client** from that IP address only.
External Port	This field displays the port number that the UAG "listens" on (on the WAN port) for connection requests destined for the NAT rule's **Internal Port** and **Internal Client**. The UAG forwards incoming packets (from the WAN) with this port number to the **Internal Client** on the **Internal Port** (on the LAN). If the field displays "0", the UAG ignores the **Internal Port** value and forwards requests on all external port numbers (that are otherwise unmapped) to the **Internal Client**.
Protocol	This field displays the protocol of the NAT mapping rule (TCP or UDP).
Internal Port	This field displays the port number on the **Internal Client** to which the UAG should forward incoming connection requests.

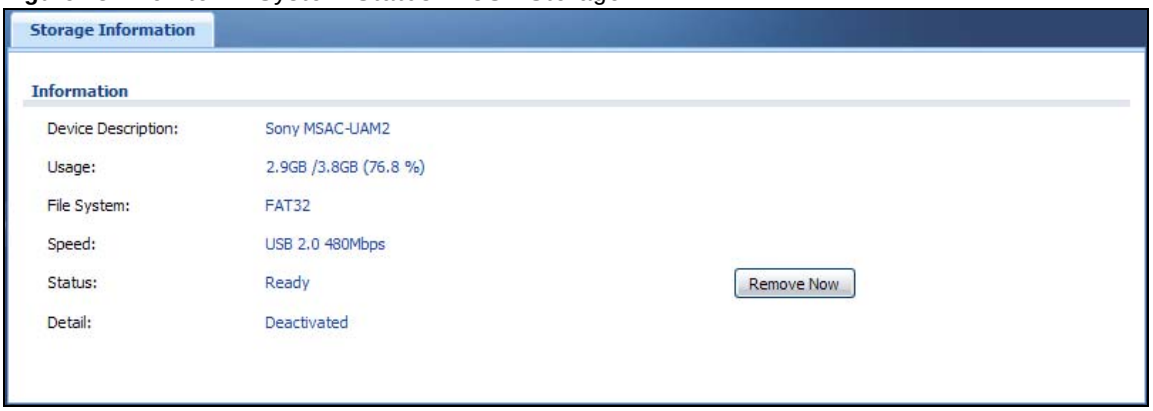
Table 28 Monitor > System Status > UPnP Port Status (continued)

LABEL	DESCRIPTION
Internal Client	This field displays the DNS host name or IP address of a client on the LAN. Multiple NAT clients can use a single port simultaneously if the internal client field is set to 255.255.255.255 for UDP mappings.
Internal Client Type	This field displays the type of the client application on the LAN.
Description	This field displays a text explanation of the NAT mapping rule.
Delete All	Click this to remove all mapping rules from the NAT table.
Refresh	Click this button to update the information in the screen.

6.10 The USB Storage Screen

This screen displays information about a connected USB storage device. Click **Monitor > System Status > USB Storage** to display this screen.

Figure 48 Monitor > System Status > USB Storage



The following table describes the labels in this screen.

Table 29 Monitor > System Status > USB Storage

LABEL	DESCRIPTION
Device description	This is a basic description of the type of USB device.
Usage	This field displays how much of the USB storage device's capacity is currently being used out of its total capacity and what percentage that makes.
Filesystem	This field displays what file system the USB storage device is formatted with. This field displays **Unknown** if the file system of the USB storage device is not supported by the UAG, such as NTFS.
Speed	This field displays the connection speed the USB storage device supports.

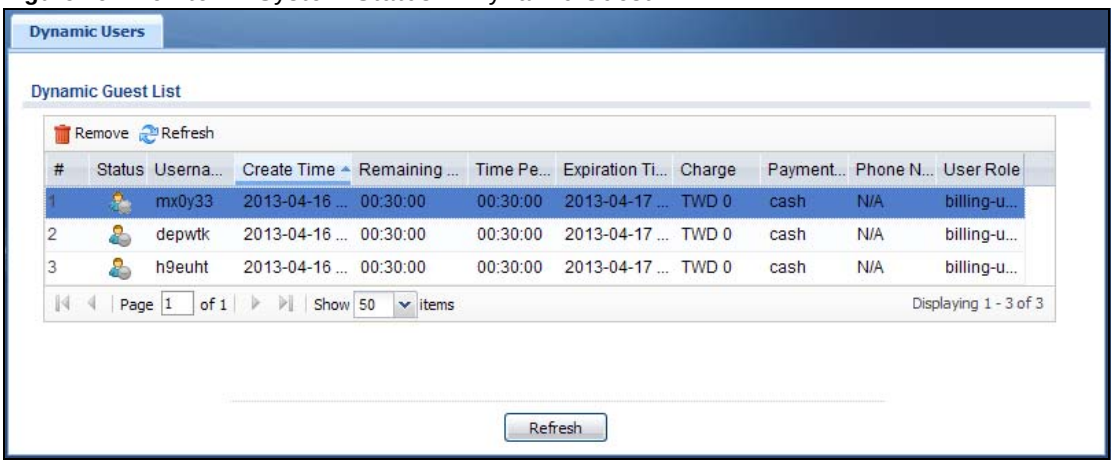
Table 29 Monitor > System Status > USB Storage (continued)

LABEL	DESCRIPTION
Status	**Ready** - you can have the UAG use the USB storage device. Click **Remove Now** to stop the UAG from using the USB storage device so you can remove it. **Unused** - the connected USB storage device was manually unmounted by using the **Remove Now** button or for some reason the UAG cannot mount it. Click **Use It** to have the UAG mount a connected USB storage device. This button is grayed out if the file system is not supported (unknown) by the UAG. **none** - no USB storage device is connected.
Detail	This field displays any other information the UAG retrieves from the USB storage device. **Deactivated** - the use of a USB storage device is disabled (turned off) on the UAG. **OutofSpace** - the available disk space is less than the disk space full threshold (see Section 39.2 on page 345 for how to configure this threshold). **Mounting** - the UAG is mounting the USB storage device. **Removing** - the UAG is unmounting the USB storage device. **none** - the USB device is operating normally or not connected.

6.11 The Dynamic Guest Screen

Dynamic guest accounts can be automatically generated for guest users by using a connected statement printer or the web configurator with the guest-manager account (see Section 25.3.1 on page 241 for more information). A dynamic guest account has a dynamically-created user name and password. Guest users can log in with the dynamic guest accounts when connecting to an SSID for a specified time unit. Use this screen to look at a list of dynamic guest user accounts on the UAG's local database. To access this screen, click **Monitor > System Status > Dynamic Guest**.

Figure 49 Monitor > System Status > Dynamic Guest



The following table describes the labels in this screen.

Table 30 Monitor > System Status > Dynamic Guest

LABEL	DESCRIPTION
Remove	Select an entry and click this button to remove it from the list. Note: If you delete a valid user account which is in use, the UAG ends the user session.
Refresh	Click this button to update the information in the screen.
#	This is the index number of the dynamic guest account in the list.
Status	This field displays whether an account expires or not.
Username	This field displays the user name of the account.
Create Time	This field displays when the account was created.
Remaining Time	This field displays the amount of Internet access time remaining for each account.
Time Period	This field displays the total account of time the account can use to access the Internet through the UAG.
Expiration Time	This field displays the date and time the account becomes invalid. Note: Once the time allocated to a dynamic account is used up or a dynamic account remains un-used after the expiration time, the account is deleted from the account list.
Charge	This field displays the total cost of the account.
Payment Info	This field displays the method of payment for each account.
Phone Num	This field displays the mobile phone number for the account.
User Role	This field displays the role of the account.
Refresh	Click this button to update the information in the screen.

The following table describes the icons in this screen.

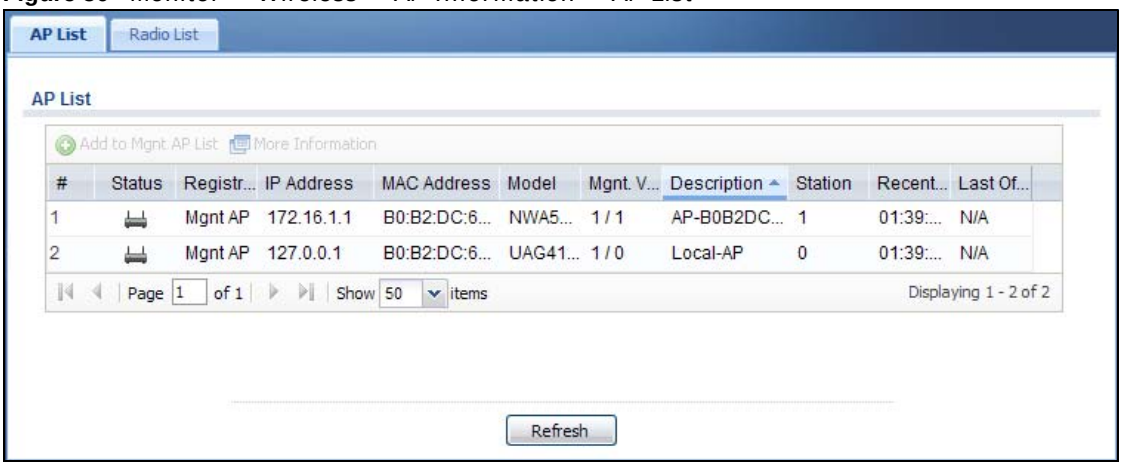
Table 31 Monitor > System Status > Dynamic Guest Icons

LABEL	DESCRIPTION
	This guest account is un-used.
	This guest account is in use and online.
	This guest account has been used but is offline now.
	This guest account expired.
	This guest account has been deleted.

6.12 The AP List Screen

Use this screen to view which APs are currently connected to the UAG. To access this screen, click **Monitor > Wireless > AP Information > AP List**.

Figure 50 Monitor > Wireless > AP Information > AP List



The following table describes the labels in this screen.

Table 32 Monitor > Wireless > AP Information > AP List

LABEL	DESCRIPTION
Add to Mgnt AP List	Click this to add the selected AP to the managed AP list.
More Information	Click this to view a daily station count about the selected AP. The count records station activity on the AP over a consecutive 24 hour period.
#	This is the AP's index number in this list.
Status	This visually displays the AP's connection status with icons. For details on the different **Status** states, see the next table.
Registration	This indicates whether the AP is registered with the managed AP list.
IP Address	This displays the AP's IP address.
MAC Address	This displays the AP's MAC address.
Model	This displays the AP's model number.
Mgnt. VLAN ID(AC/AP)	This displays the Access Controller (the UAG) management VLAN ID setting for the AP and the runtime management VLAN ID setting on the AP. **VLAN Conflict** displays if the AP's management VLAN ID does not match the UAG's management VLAN ID setting for the AP. This field displays **n/a** if the UAG cannot get VLAN information from the AP.
Description	This displays the AP's associated description. The default description is "AP-" + the AP's MAC Address.
Station	This displays the number of stations (aka wireless clients) associated with the AP.
Recent On-line Time	This displays the most recent time the AP came on-line. **N/A** displays if the AP has not come on-line since the UAG last started up.
Last Off-line Time	This displays the most recent time the AP went off-line. **N/A** displays if the AP has either not come on-line or gone off-line since the UAG last started up.

The following table describes the icons in this screen.

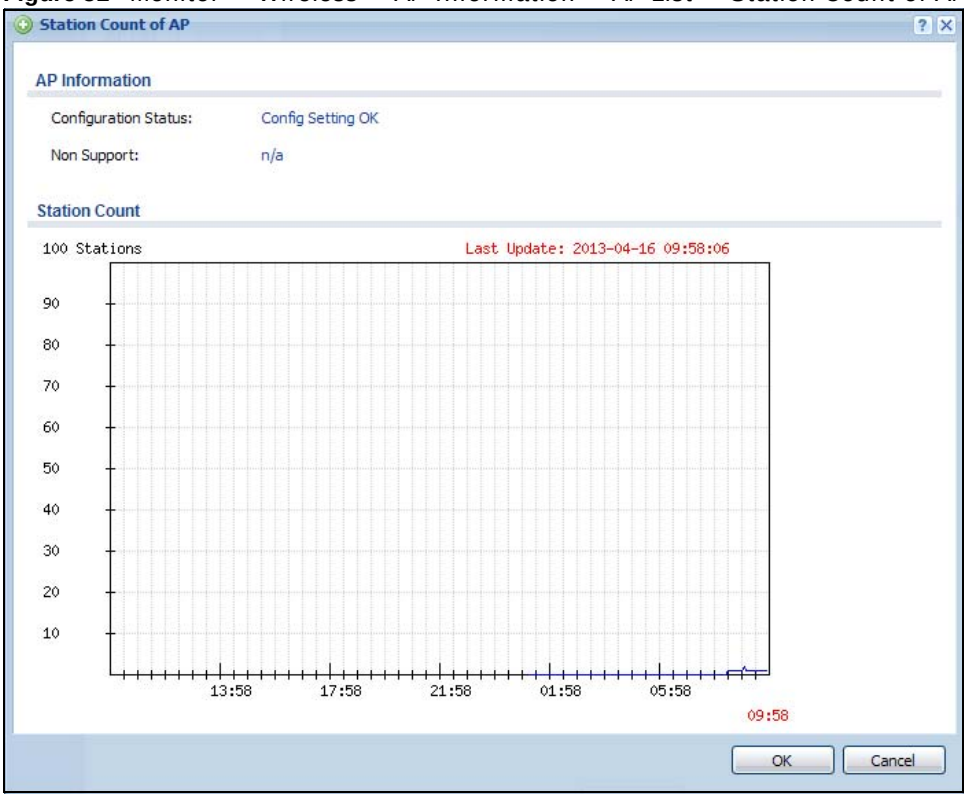
Table 33 Monitor > Wireless > AP Information > AP List Icons

LABEL	DESCRIPTION
	This AP is not on the management list.
	This AP is on the management list and online.
	This AP is in the process of having its firmware updated.
	This AP is on the management list but offline.
	This indicates one of the following cases: • This AP has a runtime management VLAN ID setting that conflicts with the VLAN ID setting on the Access Controller (the UAG). • A setting the UAG assigns to this AP does not match the AP's capability.

6.12.1 Station Count of AP

Use this screen to look at station statistics for the connected AP. To access this screen, select an entry and click the **More Information** button in the **AP List** screen.

Figure 51 Monitor > Wireless > AP Information > AP List > Station Count of AP



The following table describes the labels in this screen.

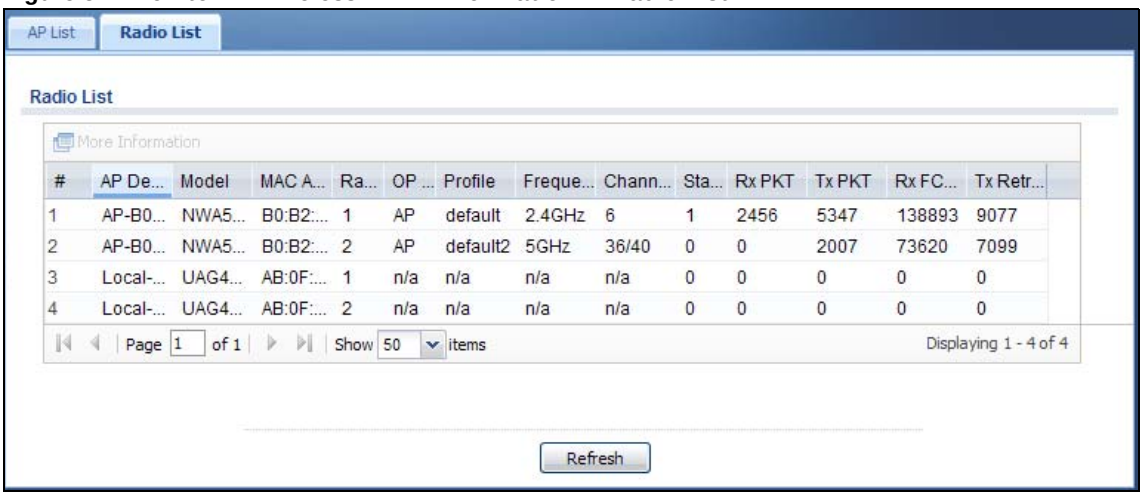
Table 34 Monitor > Wireless > AP Information > AP List > Station Count of AP

LABEL	DESCRIPTION
Configuration Status	This displays whether or not any of the AP's configuration is in conflict with the UAG's settings for the AP.
Non Support	If any of the AP's configuration conflicts with the UAG's settings for the AP, this field displays which configuration conflicts. It displays **n/a** if none of the AP's configuration conflicts with the UAG's settings for the AP.
Station Count	
	The y-axis represents the number of connected stations.
	The x-axis shows the time over which a station was connected.
Last Update	This field displays the date and time the information in the window was last updated.

6.13 The Radio List Screen

Use this screen to view statistics about the wireless radio transmitters in each of the APs connected to the UAG. To access this screen, click **Monitor > Wireless > AP Information > Radio List**.

Figure 52 Monitor > Wireless > AP Information > Radio List



The following table describes the labels in this screen.

Table 35 Monitor > Wireless > AP Information > Radio List

LABEL	DESCRIPTION
More Information	Click this to view additional information about the selected radio's SSID(s), wireless traffic and wireless clients. Information spans a 24 hour period.
#	This is the radio's index number in this list.
AP Description	This displays the description of the AP to which the radio belongs.
Model	This displays the model of the AP to which the radio belongs.
MAC Address	This displays the MAC address of the radio.
Radio	This indicates the radio number on the AP to which it belongs.
OP Mode	This indicates the radio's operating mode, such as **AP** (access point).

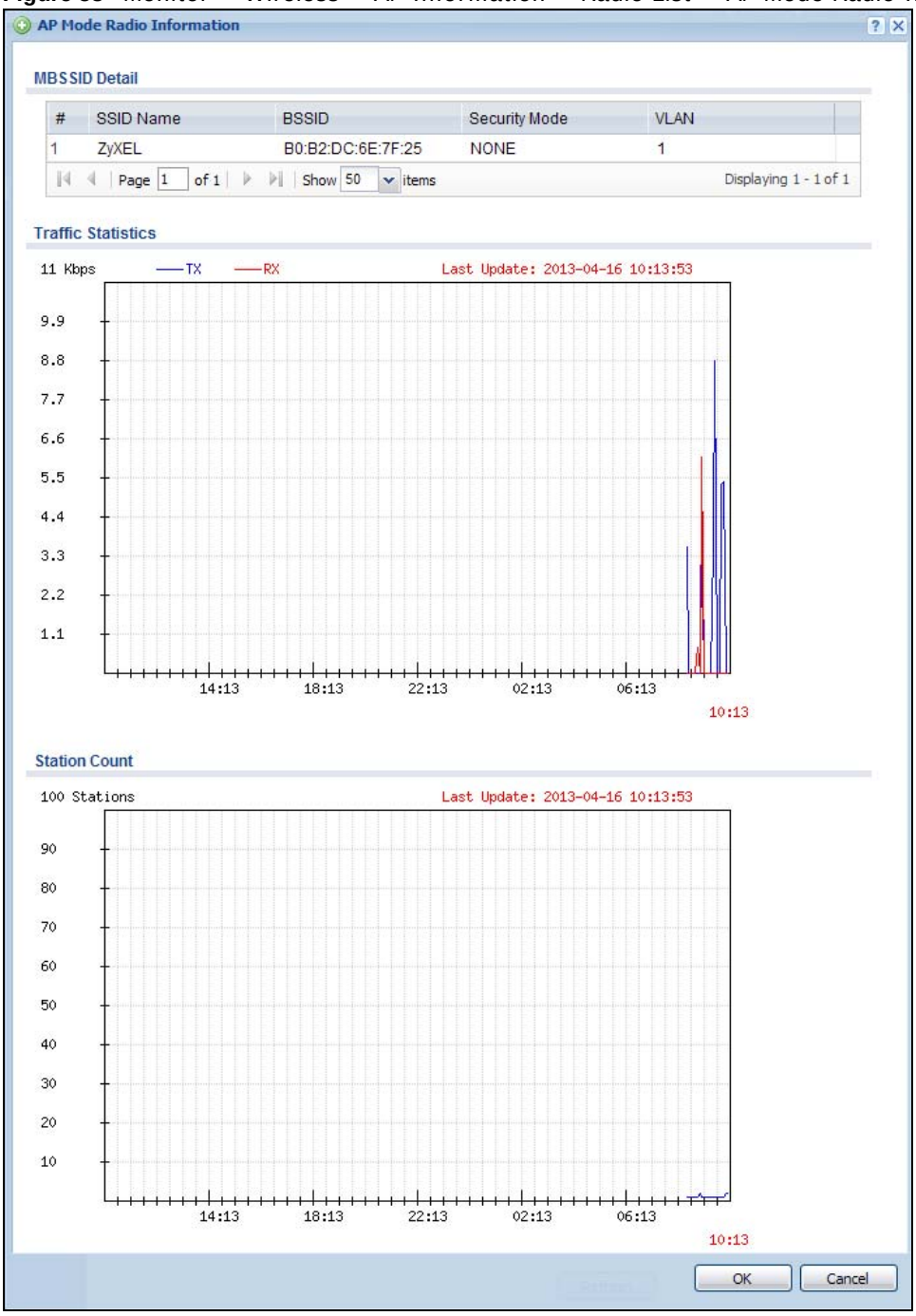
Table 35 Monitor > Wireless > AP Information > Radio List (continued)

LABEL	DESCRIPTION
Profile	This indicates the profile name to which the radio belongs.
Frequency	This indicates the wireless frequency currently being used by the radio. This shows **-** when the radio is in monitor mode.
Channel ID	This indicates the radio's channel ID.
Station	This displays the number of stations (aka wireless clients) associated with the radio.
Rx PKT	This displays the total number of packets received by the radio.
Tx PKT	This displays the total number of packets transmitted by the radio.
Rx FCS Error Count	This indicates the number of received packet errors accrued by the radio.
Tx Retry Count	This indicates the number of times the radio has attempted to re-transmit packets.

6.13.1 AP Mode Radio Information

This screen allows you to view detailed information about a selected radio's SSID(s), wireless traffic and wireless clients for the preceding 24 hours. To access this window, select an entry and click the **More Information** button in the **Radio List** screen.

Figure 53 Monitor > Wireless > AP Information > Radio List > AP Mode Radio Information



The following table describes the labels in this screen.

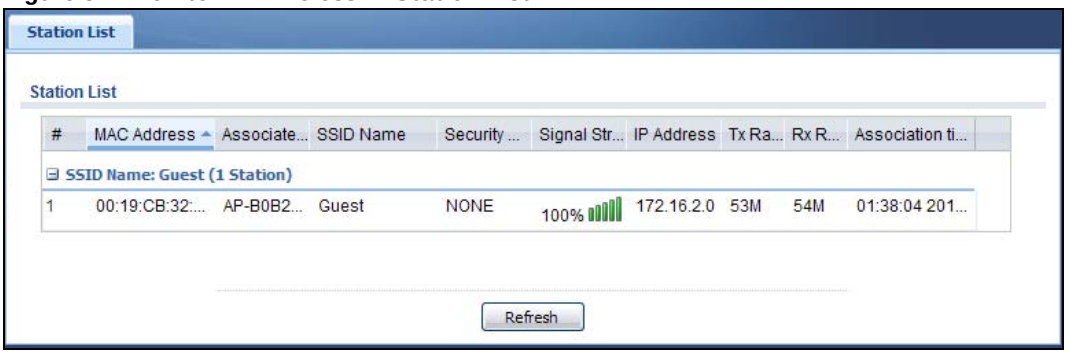
Table 36 Monitor > Wireless > AP Info > Radio List > AP Mode Radio Information

LABEL	DESCRIPTION
MBSSID Detail	This list shows information about the SSID(s) that is associated with the radio over the preceding 24 hours.
#	This is the items sequential number in the list. It has no bearing on the actual data in this list.
SSID Name	This displays an SSID associated with this radio. There can be up to eight maximum.
BSSID	This displays the MAC address associated with the SSID.
Security Mode	This displays the security mode in which the SSID is operating.
VLAN	This displays the VLAN ID associated with the SSID.
Traffic Statistics	This graph displays the overall traffic information about the radio over the preceding 24 hours.
y-axis	This axis represents the amount of data moved across this radio in megabytes per second.
x-axis	This axis represents the amount of time over which the data moved across this radio.
Station Count	This graph displays information about all the wireless clients that have connected to the radio over the preceding 24 hours.
y-axis	The y-axis represents the number of connected wireless clients.
x-axis	The x-axis shows the time over which a wireless client was connected.
Last Update	This field displays the date and time the information in the window was last updated.
OK	Click this to close this window.
Cancel	Click this to close this window.

6.14 The Station List Screen

Use this screen to view statistics pertaining to the associated stations (or “wireless clients”). Click **Monitor > Wireless > Station Info** to access this screen.

Figure 54 Monitor > Wireless > Station List



The following table describes the labels in this screen.

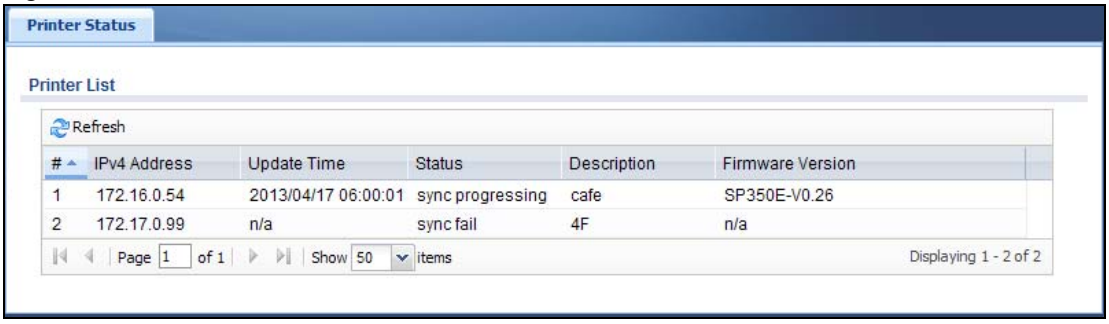
Table 37 Monitor > Wireless > Station List

LABEL	DESCRIPTION
SSID Name	This field displays the SSID name with which at least one station is associated. Click + or - to display or hide details about wireless stations that connected to the SSID.
#	This is the station's index number in this list.
MAC Address	This is the station's MAC address.
Associated AP	This indicates the AP through which the station is connected to the network.
SSID Name	This indicates the name of the wireless network to which the station is connected. A single AP can have multiple SSIDs or networks.
Security Mode	This indicates which secure encryption methods is being used by the station to connect to the network.
Signal Strength	This indicates the strength of the signal. The signal strength mainly depends on the antenna output power and the distance between the station and the AP.
IP Address	This is the station's IP address. An 169.x.x.x IP address is a private IP address that means the station didn't get the IP address from a DHCP server.
Tx Rate	This indicates the current data transmission rate of the station.
Rx Rate	This indicates the current data receiving rate of the station.
Association Time	This displays the time a wireless station first associated with the AP.
Refresh	Click this to refresh the items displayed on this page.

6.15 The Printer Status Screen

This screen displays information about the connected statement printer, such as SP350E. Click **Monitor > Printer Status** to display this screen.

Figure 55 Monitor > Printer Status



The following table describes the labels in this screen.

Table 38 Monitor > Printer Status

LABEL	DESCRIPTION
Refresh	Click this button to update the information in the screen.
#	This is the index number of the printer in the list.
IPv4 Address	This field displays the IP address of the printer that you configured in the **Configuration > Printer Manager** screen.
Update Time	This field displays the date and time the UAG last synchronized with the printer.

Table 38 Monitor > Printer Status (continued)

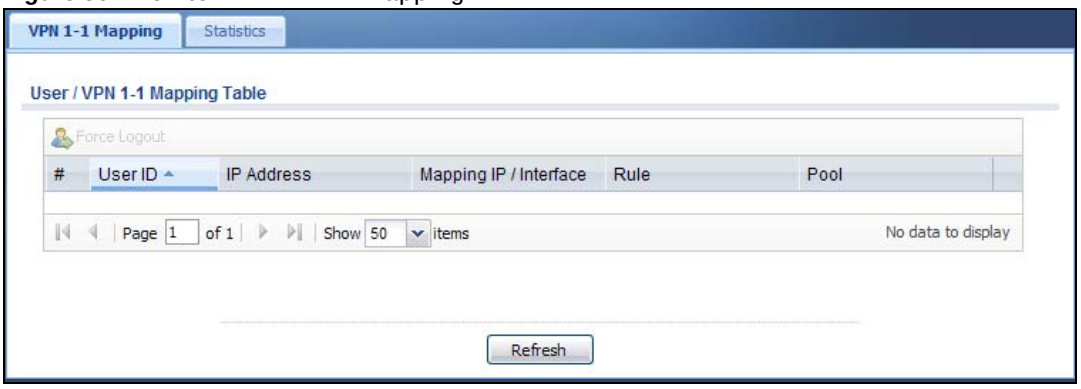
LABEL	DESCRIPTION
Status	This field displays whether the UAG can connect to the printer and update the printer information.
Description	This field displays the descriptive name of the printer that you configured in the **Configuration > Printer Manager** screen.
Firmware Version	This field displays the model number and firmware version of the printer.

6.16 The VPN 1-1 Mapping Status Screen

This screen displays the status of the active users to which the UAG applied a VPN 1-1 mapping rule.

Click **Monitor > VPN 1-1 Mapping** to open the following screen.

Figure 56 Monitor > VPN 1-1 Mapping



The following table describes the labels in this screen.

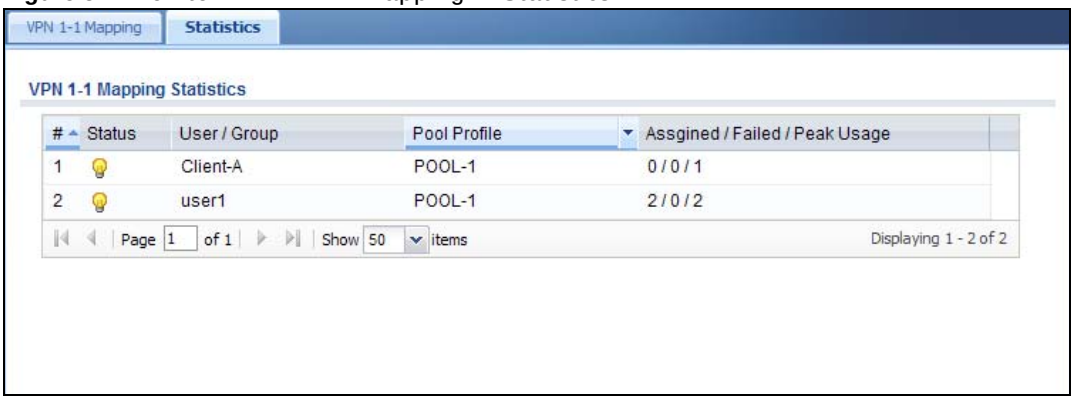
Table 39 Monitor > VPN 1-1 Mapping

LABEL	DESCRIPTION
#	This field is a sequential value and is not associated with any entry.
User ID	This field displays the user name of each user who is currently logged into the UAG and matches a pre-configured VPN 1-1 mapping rule.
IP Address	This field displays the IP address of the computer used to log in to the UAG.
Mapping IP/ Interface	This field displays the public IP address that the UAG assigns to the user according to the matched VPN 1-1 mapping rule. It also displays the interface through which the outgoing traffic is forwarded.
Rule	This field displays the index number of the matched VPN 1-1 mapping rule that you configured in the **Configuration > VPN 1-1 Mapping** screen.
Pool	This field displays the name of the pool profile that you configured for the VPN 1-1 mapping rule.
Force Logout	Select a user ID and click this icon to end a user's session.
Refresh	Click this button to update the information in the screen.

6.16.1 VPN 1-1 Mapping Statistics

This screen shows statistics for each of the VPN 1-1 mapping rules. Click **Monitor > VPN 1-1 Mapping > Statistics** to display this screen.

Figure 57 Monitor > VPN 1-1 Mapping > Statistics



The following table describes the labels in this screen.

Table 40 Monitor > VPN 1-1 Mapping > Statistics

LABEL	DESCRIPTION
#	This field displays the rule's index number in the list.
Status	The activate (light bulb) icon is lit when the entry is active and dimmed when the entry is inactive.
User/Group	This field displays the name of the user or user group object to which the rule is applied.
Pool Profile	This field displays the name of the IP address pool profile to which the rule is applied.
Assigned/Failed/ Peak Usage	This field displays how many times the UAG applied the rule to a user successfully or failed to apply the rule to a user. This also shows the maximum number of times the UAG has applied the rule to a user successfully.

6.17 The Log Screen

Log messages are stored in two separate logs, one for regular log messages and one for debugging messages. In the regular log, you can look at all the log messages by selecting **All Logs**, or you can select a specific category of log messages (for example, firewall or user). You can also look at the debugging log by selecting **Debug Log**. All debugging messages have the same priority.

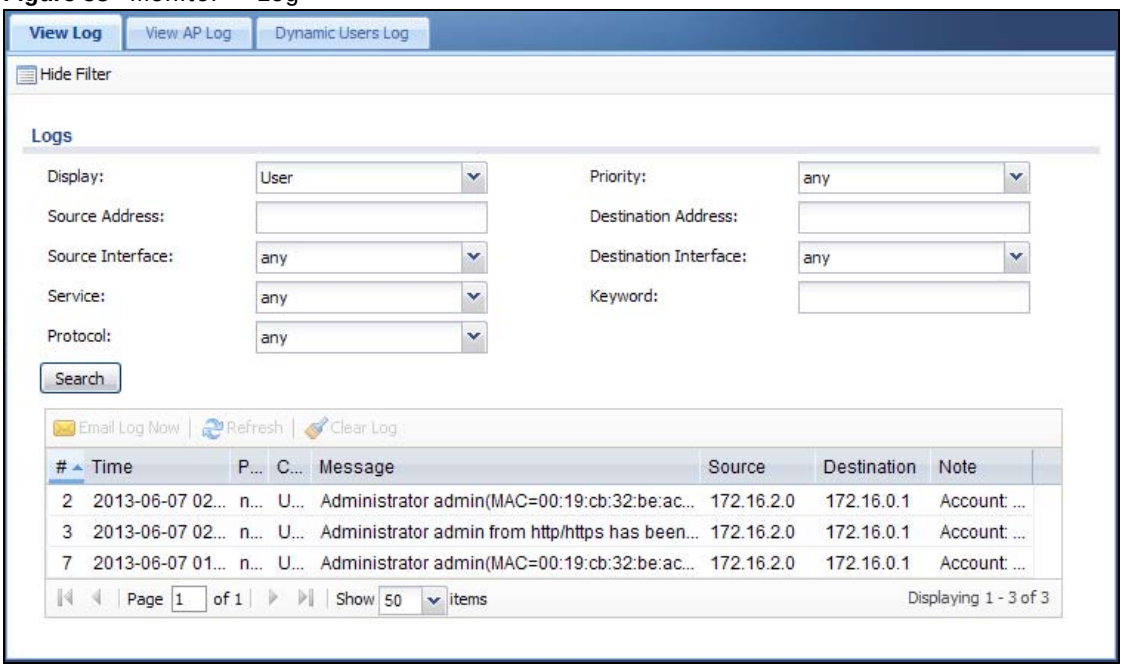
To access this screen, click **Monitor > Log**. The log is displayed in the following screen.

Note: When a log reaches the maximum number of log messages, new log messages automatically overwrite existing log messages, starting with the oldest existing log message first.

- The maximum possible number of log messages in the UAG varies by model.

Events that generate an alert (as well as a log message) display in red. Regular logs display in black. Click a column's heading cell to sort the table entries by that column's criteria. Click the heading cell again to reverse the sort order.

Figure 58 Monitor > Log



The following table describes the labels in this screen.

Table 41 Monitor > Log

LABEL	DESCRIPTION
Show Filter / Hide Filter	Click this button to show or hide the filter settings. If the filter settings are hidden, the **Display**, **Email Log Now**, **Refresh**, and **Clear Log** fields are available. If the filter settings are shown, the **Display**, **Priority**, **Source Address**, **Destination Address**, **Source Interface**, **Destination Interface**, **Service**, **Keyword**, **Protocol** and **Search** fields are available.
Display	Select the category of log message(s) you want to view. You can also view **All Logs** at one time, or you can view the **Debug Log**.
Priority	This displays when you show the filter. Select the priority of log messages to display. The log displays the log messages with this priority or higher. Choices are: **any**, **emerg**, **alert**, **crit**, **error**, **warn**, **notice**, and **info**, from highest priority to lowest priority. This field is read-only if the **Category** is **Debug Log**.
Source Address	This displays when you show the filter. Type the source IP address of the incoming packet that generated the log message. Do not include the port in this filter.
Destination Address	This displays when you show the filter. Type the IP address of the destination of the incoming packet when the log message was generated. Do not include the port in this filter.
Source Interface	This displays when you show the filter. Select the source interface of the packet that generated the log message.
Destination Interface	This displays when you show the filter. Select the destination interface of the packet that generated the log message.
Service	This displays when you show the filter. Select the service whose log messages you would like to see. The Web Configurator uses the protocol and destination port number(s) of the service to select which log messages you see.

Table 41 Monitor > Log (continued)

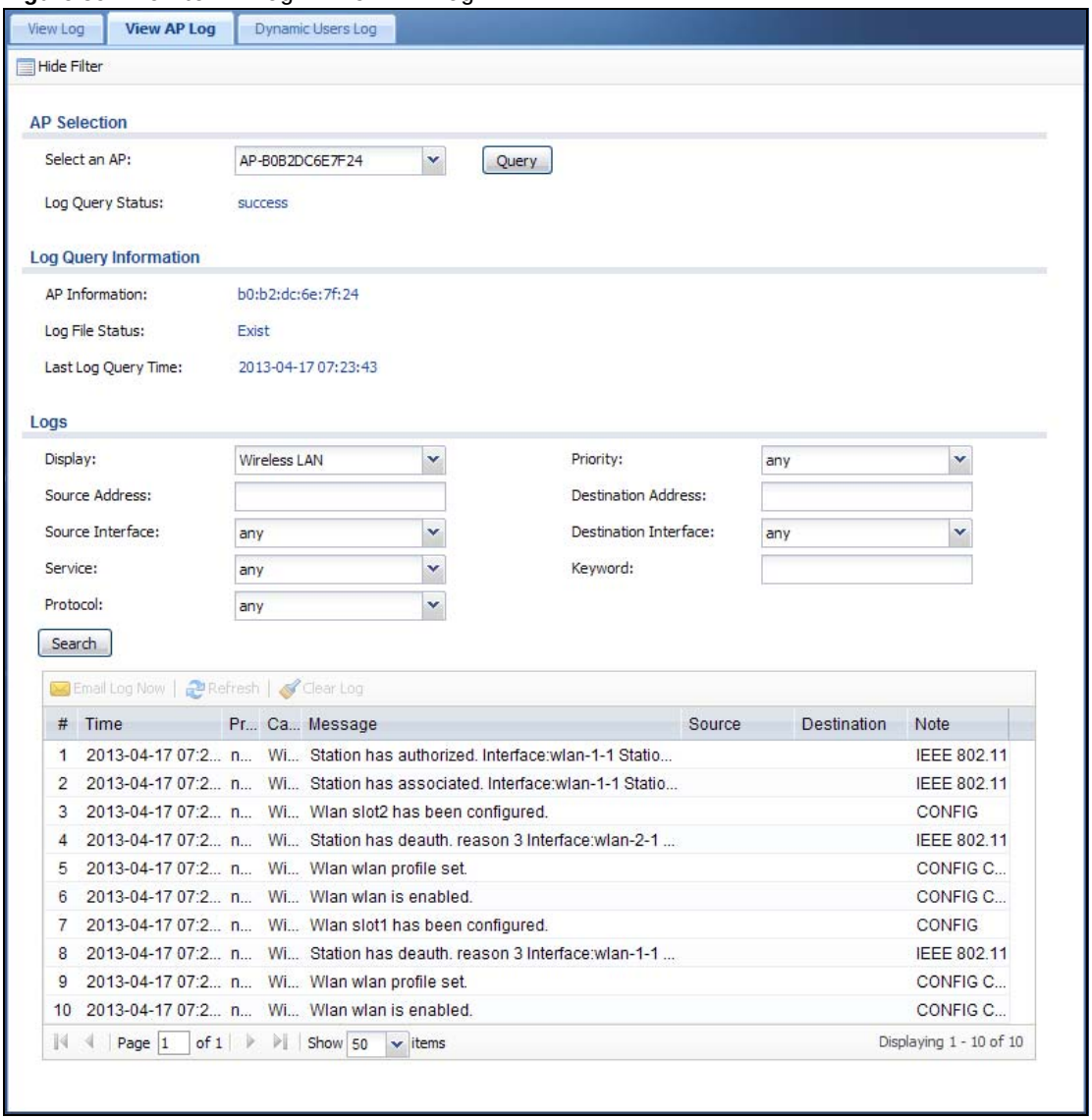
LABEL	DESCRIPTION
Keyword	This displays when you show the filter. Type a keyword to look for in the **Message**, **Source**, **Destination** and **Note** fields. If a match is found in any field, the log message is displayed. You can use up to 63 alphanumeric characters and the underscore, as well as punctuation marks ()' ,:;?! +-*/= #$% @ ; the period, double quotes, and brackets are not allowed.
Protocol	This displays when you show the filter. Select a service protocol whose log messages you would like to see.
Search	This displays when you show the filter. Click this button to update the log using the current filter settings.
Email Log Now	Click this button to send log message(s) to the **Active** e-mail address(es) specified in the **Send Log To** field on the **Log Settings** page (see Section 40.3.2 on page 389).
Refresh	Click **Refresh** to update this screen.
Clear Log	Click this button to clear the whole log, regardless of what is currently displayed on the screen.
#	This field is a sequential value, and it is not associated with a specific log message.
Time	This field displays the time the log message was recorded.
Priority	This field displays the priority of the log message. It has the same range of values as the **Priority** field above.
Category	This field displays the log that generated the log message. It is the same value used in the **Display** and (other) **Category** fields.
Message	This field displays the reason the log message was generated. The text "[count=*x*]", where *x* is a number, appears at the end of the **Message** field if log consolidation is turned on (see **Log Consolidation** in Table 198 on page 391). and multiple entries were aggregated to generate into this one.
Source	This field displays the source IP address and the port number in the event that generated the log message.
Destination	This field displays the destination IP address and the port number of the event that generated the log message.
Note	This field displays any additional information about the log message.

The Web Configurator saves the filter settings if you leave the **View Log** screen and return to it later.

6.17.1 View AP Log

Use this screen to view the UAG's current wireless AP log messages. Click **Monitor > Log > View AP Log** to access this screen.

Figure 59 Monitor > Log > View AP Log



The following table describes the labels in this screen.

Table 42 Monitor > Log > View AP Log

LABEL	DESCRIPTION
Show/Hide Filter	Click this to show or hide the AP log filter.
Select an AP	Select an AP from the list and click **Query** to view its log messages.

Table 42 Monitor > Log > View AP Log (continued)

LABEL	DESCRIPTION
Log Query Status	This indicates the current log query status. **init** - Indicates the query has not been initialized. **querying** - Indicates the query is in process. **fail** - Indicates the query failed. **success** - Indicates the query succeeded.
AP Information	This displays the MAC address for the selected AP.
Log File Status	This indicates the status of the AP's log messages.
Last Log Query Time	This indicates the last time the AP was queried for its log messages.
Display	Select the log file from the specified AP that you want displayed. Note: This criterion only appears when you **Show Filter**.
Priority	Select a priority level to use for filtering displayed log messages. Note: This criterion only appears when you **Show Filter**.
Source Address	Enter a source IP address to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Destination Address	Enter a destination IP address to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Source Interface	Enter a source interface to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Destination Interface	Enter a destination interface to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Service	Select a service type to display only the log messages related to it. Note: This criterion only appears when you **Show Filter**.
Keyword	Enter a keyword to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Protocol	Select a protocol to display only the log messages that include it. Note: This criterion only appears when you **Show Filter**.
Search	Click this to start the log query based on the selected criteria. If no criteria have been selected, then this displays all log messages for the specified AP regardless.
Email Log Now	Click this open a new e-mail in your default e-mail program with the selected log attached.
Refresh	Click this to refresh the log table.
Clear Log	Click this to clear the log on the specified AP.
#	This field is a sequential value, and it is not associated with a specific log message.
Time	This indicates the time that the log messages was created or recorded on the AP.
Priority	This indicates the selected log message's priority.
Category	This indicates the selected log message's category.
Message	This displays content of the selected log message.

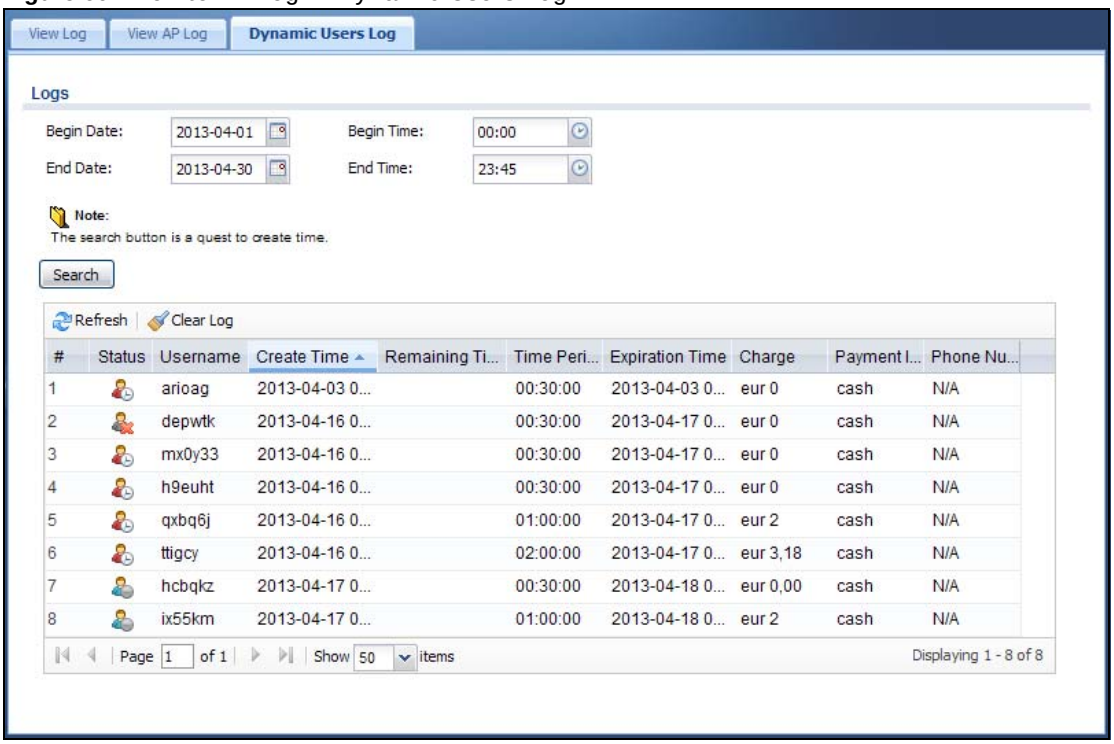
Table 42 Monitor > Log > View AP Log (continued)

LABEL	DESCRIPTION
Source	This displays the source IP address of the selected log message.
Destination	This displays the source IP address of the selected log message.
Note	This displays any notes associated with the selected log message.

6.17.2 Dynamic Users Log

Use this screen to view the UAG's dynamic guest account log messages. Click **Monitor > Log > Dynamic Users Log** to access this screen.

Figure 60 Monitor > Log > Dynamic Users Log



The following table describes the labels in this screen.

Table 43 Monitor > Log > Dynamic Users Log

LABEL	DESCRIPTION
Begin/End Date	Select the first and last dates to specify a time period. The UAG displays log messages only for the accounts created during the specified time period after you click **Search**.
Begin/End Time	Select the begin time of the first date and the end time of the last date to specify a time period. The UAG displays log messages only for the accounts created during the specified time period after you click **Search**.
Search	Click this button to update the information on the screen using the filter criteria in the date and time fields.
Refresh	Click this button to update the information in the screen.
Clear Log	Click this button to delete the log messages for invalid accounts.
#	This is the index number of the dynamic guest account in the list.
Status	This field displays whether an account expires or not.

Table 43 Monitor > Log > Dynamic Users Log (continued)

LABEL	DESCRIPTION
Username	This field displays the user name of the account.
Create Time	This field displays when the account was created.
Remaining Time	This field displays the amount of Internet access time remaining for each account.
Time Period	This field displays the total account of time the account can use to access the Internet through the UAG.
Expiration Time	This field displays the date and time the account becomes invalid. Note: Once the time allocated to a dynamic account is used up or a dynamic account remains un-used after the expiration time, the account is deleted from the account list.
Charge	This field displays the total cost of the account.
Payment Info	This field displays the method of payment for each account.
Phone Num	This field displays the telephone number for the user account.

7

Registration

7.1 Overview

Use the **Configuration > Licensing > Registration** screens to register your UAG and manage its service subscriptions.

7.1.1 What You Can Do in this Chapter

- Use the **Registration** screen (see Section 7.2 on page 91) to register your UAG with myZyXEL.com.
- Use the **Service** screen (see Section 7.3 on page 91) to display the status of your service registrations and upgrade licenses.

7.1.2 What you Need to Know

This section introduces the topics covered in this chapter.

myZyXEL.com

myZyXEL.com is ZyXEL's online services center where you can register your UAG and manage subscription services available for the UAG. To use a subscription service, you have to register the UAG and activate the corresponding service at myZyXEL.com (through the UAG).

Note: You need to create a myZyXEL.com account before you can register your device and activate the services at myZyXEL.com.

Go to http://portal.myZyXEL.com with the UAG's serial number and LAN MAC address to register it. Refer to the web site's on-line help for details.

Note: To activate a service on a UAG, you need to access myZyXEL.com via that UAG.

Subscription Services Available on the UAG

At the time of writing, the UAG can use the upgrade service to extend the maximum number of the supported managed APs and the LAN/WLAN users that can connect to the UAG at one time.

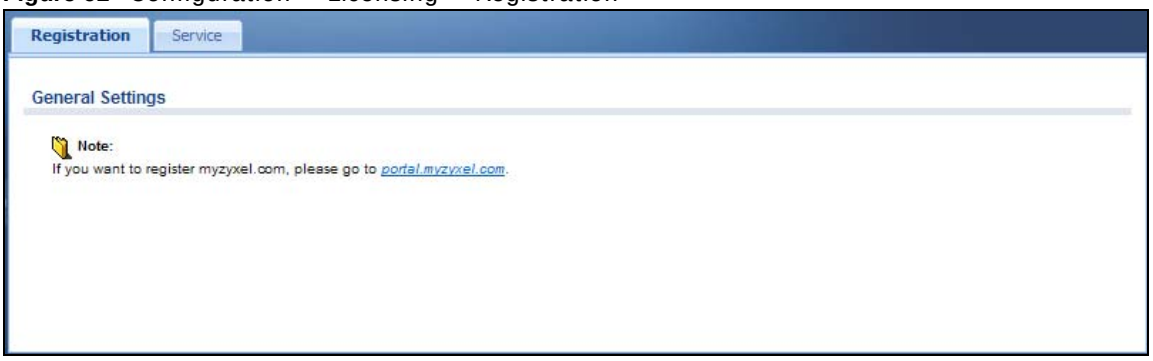
Maximum Number of Managed APs

The UAG is initially configured to support up to one local AP and 8 remote managed APs (such as the NWA5123-NI). You can increase this by subscribing to additional licenses. As of this writing, each license upgrade allows an additional 8 remote managed APs while the maximum number of remote managed APs a single UAG can support is 16.

7.2 Registration Screen

Click the link in this screen to register your UAG with myZyXEL.com. The UAG should already have Internet access before you can register it. Click **Configuration > Licensing > Registration** in the navigation panel to open the screen as shown next.

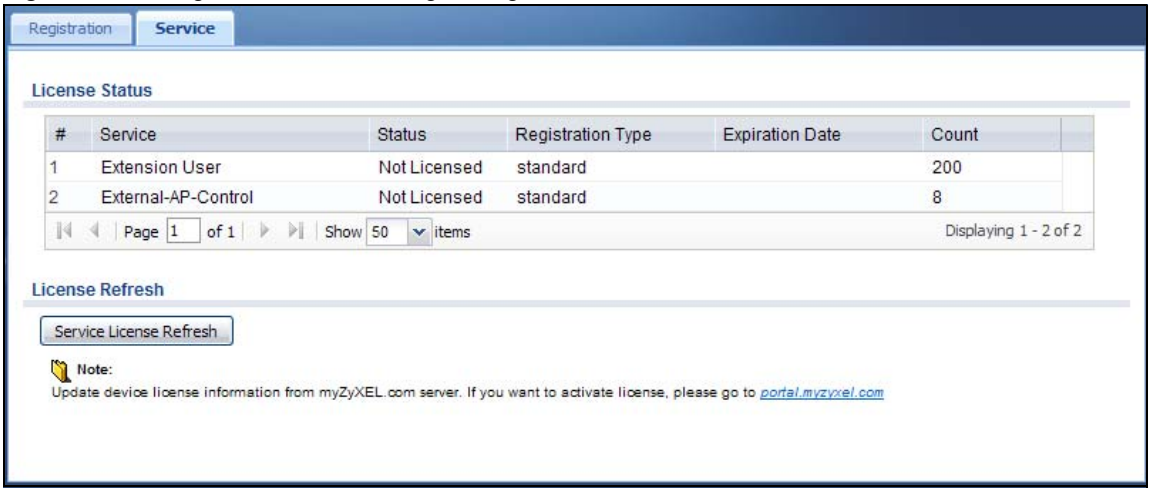
Figure 61 Configuration > Licensing > Registration



7.3 Service Screen

Use this screen to display the status of your service registrations. To activate or extend a standard service subscription, purchase an iCard and enter the iCard's PIN number (license key) at myZyXEL.com. Click **Configuration > Licensing > Registration** > **Service** to open the screen as shown next.

Figure 62 Configuration > Licensing > Registration > Service



The following table describes the labels in this screen.

Table 44 Configuration > Licensing > Registration > Service

LABEL	DESCRIPTION
License Status	
#	This is the entry's position in the list.
Service	This lists the services that available on the UAG.

Table 44 Configuration > Licensing > Registration > Service (continued)

LABEL	DESCRIPTION
Status	This field displays whether a service is activated (**Licensed**) or not (**Not Licensed**) or expired (**Expired**).
Registration Type	This field displays whether you applied for a trial application (**Trial**) or registered a service with your iCard's PIN number (**Standard**). This field is blank when a service is not activated.
Expiration Date	This field displays the date your service expires.
Count	This field displays the maximum number of wired and wireless users that may connect to the UAG at the same time or how many managed APs the UAG can support with your current license.
Service License Refresh	Click this button to renew service license information (such as the registration status and expiration day).

8

Wireless

8.1 Overview

Use the **Wireless** screens to configure how the UAG manages the Access Points (APs) that are connected to it.

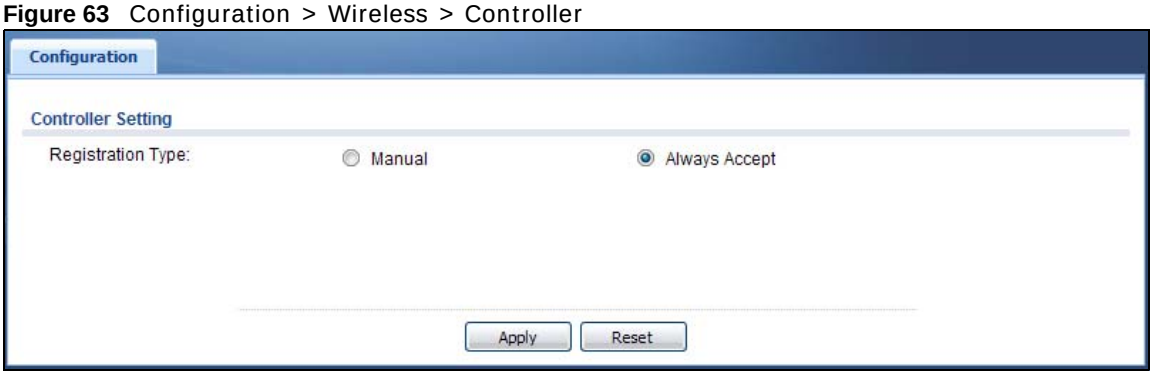
8.1.1 What You Can Do in this Chapter

- The **Controller** screen (Section 8.2 on page 93) sets how the UAG allows new APs to connect to the network.
- The **AP Management** screen (Section 8.3 on page 94) manages all of the APs connected to the UAG.

8.2 Controller Screen

Use this screen to set how the UAG allows new APs to connect to the network. Click **Configuration > Wireless > Controller** to access this screen.

Figure 63 Configuration > Wireless > Controller



Each field is described in the following table.

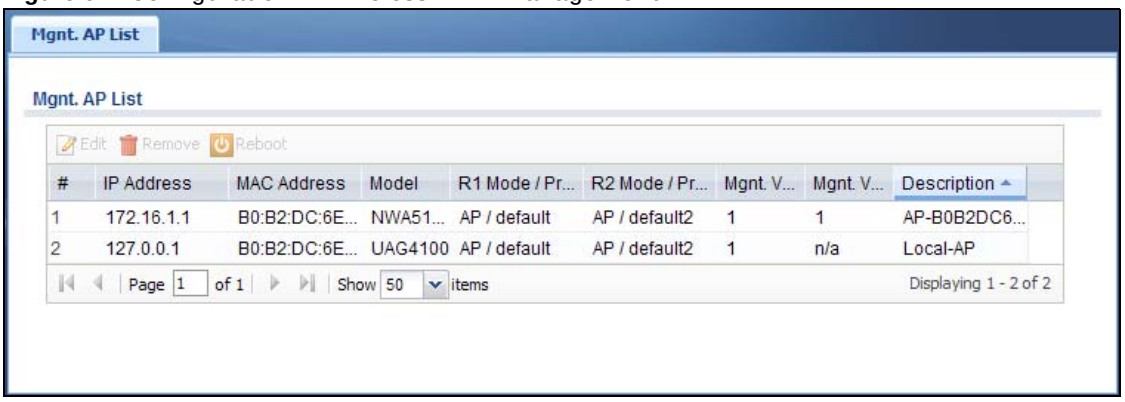
Table 45 Configuration > Wireless > Controller

LABEL	DESCRIPTION
Registration Type	Select **Manual** to add each AP to the UAG for management, or **Always Accept** to automatically add APs to the UAG for management. Note: Select the **Manual** option for managing a specific set of APs. This is recommended as the registration mechanism cannot automatically differentiate between friendly and rogue APs. APs must be connected to the UAG by a wired connection or network.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

8.3 AP Management Screen

Use this screen to manage all of the APs connected to the UAG. Click **Configuration > Wireless > AP Management** to access this screen.

Figure 64 Configuration > Wireless > AP Management



Each field is described in the following table.

Table 46 Configuration > Wireless > AP Management

LABEL	DESCRIPTION
Edit	Select an AP and click this button to edit its properties.
Remove	Select an AP and click this button to remove it from the list. Note: If in the **Configuration > Wireless > Controller** screen you set the **Registration Type** to **Always Accept**, then as soon as you remove an AP from this list it reconnects.
Reboot	Select an AP and click this button to force it to restart.
#	This field is a sequential value, and it is not associated with any entry.
IP Address	This field displays the IP address of the AP.
MAC Address	This field displays the MAC address of the AP.

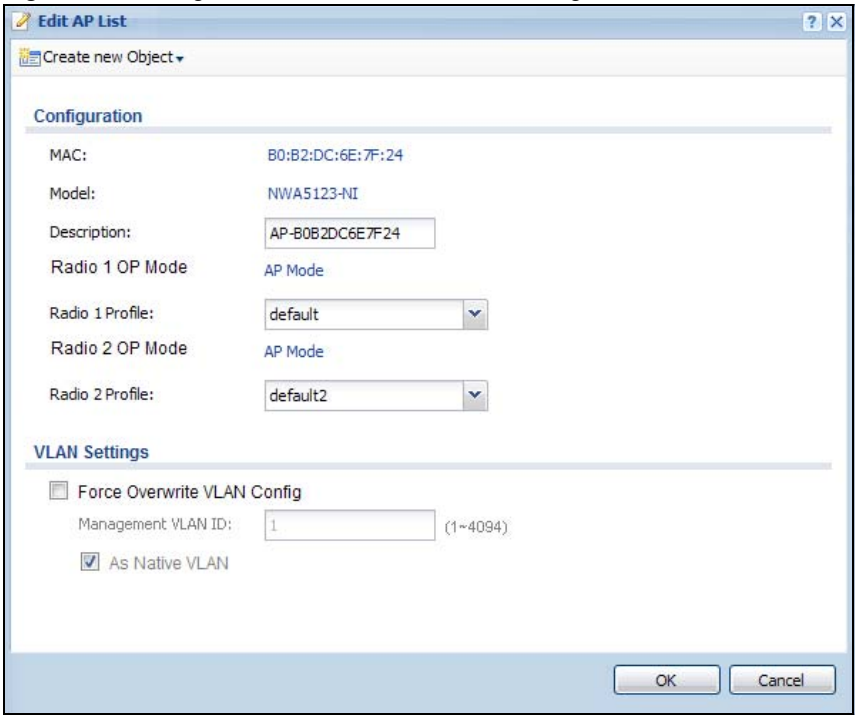
Table 46 Configuration > Wireless > AP Management (continued)

LABEL	DESCRIPTION
Model	This field displays the AP's hardware model information. It displays **N/A** (not applicable) only when the AP disconnects from the UAG and the information is unavailable as a result.
R1 Mode / Profile	This field displays the operating mode (**AP**) and AP profile name for Radio 1. It displays **n/a** for the profile for a radio not using an AP profile.
R2 Mode / Profile	This field displays the operating mode (**AP**) and AP profile name for Radio 2. It displays **n/a** for the profile for a radio not using an AP profile.
Mgnt. VLAN ID(AC)	This displays the Access Controller (the UAG) management VLAN ID setting for the AP.
Mgnt. VLAN ID(AP)	This displays the runtime management VLAN ID setting on the AP. **VLAN Conflict** displays if the AP's management VLAN ID does not match the **Mgnt. VLAN ID(AC)**. This field displays **n/a** if the UAG cannot get VLAN information from the AP.
Description	This field displays the AP's description, which you can configure by selecting the AP's entry and clicking the **Edit** button.

8.3.1 Edit AP List

Select an AP and click the **Edit** button in the **Configuration > Wireless > AP Management** table to display this screen.

Figure 65 Configuration > Wireless > AP Management > Edit AP List



Each field is described in the following table.

Table 47 Configuration > Wireless > AP Management > Edit AP List

LABEL	DESCRIPTION
Create new Object	Use this menu to create a new **Radio Profile** object to associate with this AP.
MAC	This displays the MAC address of the selected AP.

Table 47 Configuration > Wireless > AP Management > Edit AP List (continued)

LABEL	DESCRIPTION
Model	This field displays the AP's hardware model information. It displays **N/A** (not applicable) only when the AP disconnects from the UAG and the information is unavailable as a result.
Description	Enter a description for this AP. You can use up to 31 characters, spaces and underscores allowed.
Radio 1/2 OP Mode	Select the operating mode for radio 1 or radio 2. **AP Mode** means the AP can receive connections from wireless clients and pass their data traffic through to the UAG to be managed (or subsequently passed on to an upstream gateway for managing).
Radio 1/2 Profile	Select a profile from the list. If no profile exists, you can create a new one through the **Create new Object** menu.
Force Overwrite VLAN Config	Select this to have the UAG change the AP's management VLAN to match the configuration in this screen.
Management VLAN ID	Enter a VLAN ID for this AP.
As Native VLAN	Select this option to treat this VLAN ID as a VLAN created on the UAG and not one assigned to it from outside the network.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to close the window with changes unsaved.

9

Interfaces

9.1 Interface Overview

Use the **Interface** screens to configure the UAG's interfaces. You can also create interfaces on top of other interfaces.

- **Ports** are the physical ports to which you connect cables.
- **Interfaces** are used within the system operationally. You use them in configuring various features. An interface also describes a network that is directly connected to the UAG. For example, You connect the LAN network to the LAN interface.
- **Zones** are groups of interfaces used to ease security policy configuration.

9.1.1 What You Can Do in this Chapter

- Use the **Port Role** screen (Section 9.2 on page 99) to create port groups and to assign physical ports and port groups to Ethernet interfaces.
- Use the **Ethernet** screens (Section 9.3 on page 100) to configure the Ethernet interfaces. Ethernet interfaces are the foundation for defining other interfaces and network policies.
- Use the **PPP** screens (Section 9.4 on page 111) for PPPoE or PPTP Internet connections.
- Use the **VLAN** screens (Section 9.5 on page 117) to divide the physical network into multiple logical networks. VLAN interfaces receive and send tagged frames. The UAG automatically adds or removes the tags as needed. Each VLAN can only be associated with one Ethernet interface.
- Use the **Bridge** screens (Section 9.6 on page 124) to combine two or more network segments into a single network.
- Use the **Virtual Interface** screen (Section 9.7.1 on page 132) to create virtual interfaces on top of Ethernet interfaces to tell the UAG where to route packets. You can create virtual Ethernet interfaces, virtual VLAN interfaces, and virtual bridge interfaces.
- Use the **Trunk** screens (Chapter 10 on page 137) to configure load balancing.

9.1.2 What You Need to Know

Interface Characteristics

Interfaces generally have the following characteristics (although not all characteristics apply to each type of interface).

- An interface is a logical entity through which (layer-3) packets pass.
- An interface is bound to a physical port or another interface.
- Many interfaces can share the same physical port.
- An interface belongs to at most one zone.
- Many interfaces can belong to the same zone.

- Layer-3 virtualization (IP alias, for example) is a kind of interface.

Types of Interfaces

You can create several types of interfaces in the UAG.

- Setting interfaces to the same port role forms a port group. Port groups create a hardware connection between physical ports at the layer-2 (data link, MAC address) level. Port groups are created when you use the **Interface > Port Roles** screen to set multiple physical ports to be part of the same interface.
- **Ethernet interfaces** are the foundation for defining other interfaces and network policies.
- **VLAN interfaces** receive and send tagged frames. The UAG automatically adds or removes the tags as needed. Each VLAN can only be associated with one Ethernet interface.
- **Bridge interfaces** create a software connection between Ethernet or VLAN interfaces at the layer-2 (data link, MAC address) level. Unlike port groups, bridge interfaces can take advantage of some security features in the UAG. You can also assign an IP address and subnet mask to the bridge.
- **PPP interfaces** support Point-to-Point Protocols (PPP). ISP accounts are required for PPPoE/PPTP interfaces.
- **Virtual interfaces** provide additional routing information in the UAG. There are three types: **virtual Ethernet interfaces**, **virtual VLAN interfaces**, and **virtual bridge interfaces**.
- **Trunk interfaces** manage load balancing between interfaces.

Port groups and trunks have a lot of characteristics that are specific to each type of interface. See Section 9.2 on page 99 and Chapter 10 on page 137 for details. The other types of interfaces--Ethernet, PPP, VLAN, bridge, and virtual--have a lot of similar characteristics. These characteristics are listed in the following table and discussed in more detail below.

Table 48 Ethernet, PPP, VLAN, Bridge, and Virtual Interface Characteristics

CHARACTERISTICS	ETHERNET	ETHERNET	PPP	VLAN	BRIDGE	VIRTUAL
Name*	wan1	lan1, lan2,	ppp*x*	vlan*x*	br*x*	**
Configurable Zone	No	Yes	Yes	Yes	Yes	No
IP Address Assignment						
Static IP address	Yes	Yes	Yes	Yes	Yes	Yes
DHCP client	Yes	No	Yes	Yes	Yes	No
Routing metric	Yes	Yes	Yes	Yes	Yes	Yes
Interface Parameters						
Bandwidth restrictions	Yes	Yes	Yes	Yes	Yes	Yes
Packet size (MTU)	Yes	Yes	Yes	Yes	Yes	No
DHCP						
DHCP server	No	Yes	No	Yes	Yes	No
DHCP relay	No	Yes	No	Yes	Yes	No
Connectivity Check	Yes	No	Yes	Yes	Yes	No

- * The format of interface names other than the Ethernet and ppp interface names is strict. Each name consists of 2-4 letters (interface type), followed by a number (*x*). For most interfaces, x is limited by the maximum number of the type of interface. For VLAN interfaces, x is defined by the number you enter in the VLAN name field. For example, Ethernet interface names are wan1, lan1, lan2; VLAN interfaces are vlan0, vlan1, vlan2, ...; and so on.

** - The names of virtual interfaces are derived from the interfaces on which they are created. For example, virtual interfaces created on Ethernet interface wan1 are called wan1:1, wan1:2, and so on. Virtual interfaces created on VLAN interface vlan2 are called vlan2:1, vlan2:2, and so on. You cannot specify the number after the colon(:) in the

Web Configurator; it is a sequential number. You can specify the number after the colon if you use the CLI to set up a virtual interface.

Relationships Between Interfaces

In the UAG, interfaces are usually created on top of other interfaces. Only Ethernet interfaces are created directly on top of the physical ports or port groups. The relationships between interfaces are explained in the following table.

Table 49 Relationships Between Different Types of Interfaces

INTERFACE	REQUIRED PORT / INTERFACE
port group	physical port
Ethernet interface	physical port port group
VLAN interface	Ethernet interface
bridge interface	Ethernet interface* VLAN interface*
PPP interface	Ethernet interface* VLAN interface* bridge interface WAN1
virtual interface (virtual Ethernet interface) (virtual VLAN interface) (virtual bridge interface)	 Ethernet interface* VLAN interface* bridge interface
trunk	Ethernet interface VLAN interface bridge interface PPP interface

* - You cannot set up a PPP interface, virtual Ethernet interface or virtual VLAN interface if the underlying interface is a member of a bridge. You also cannot add an Ethernet interface or VLAN interface to a bridge if the member interface has a virtual interface or PPP interface on top of it.

Finding Out More

- See Section 9.8 on page 133 for background information on interfaces.
- See Chapter 10 on page 137 to configure load balancing using trunks.

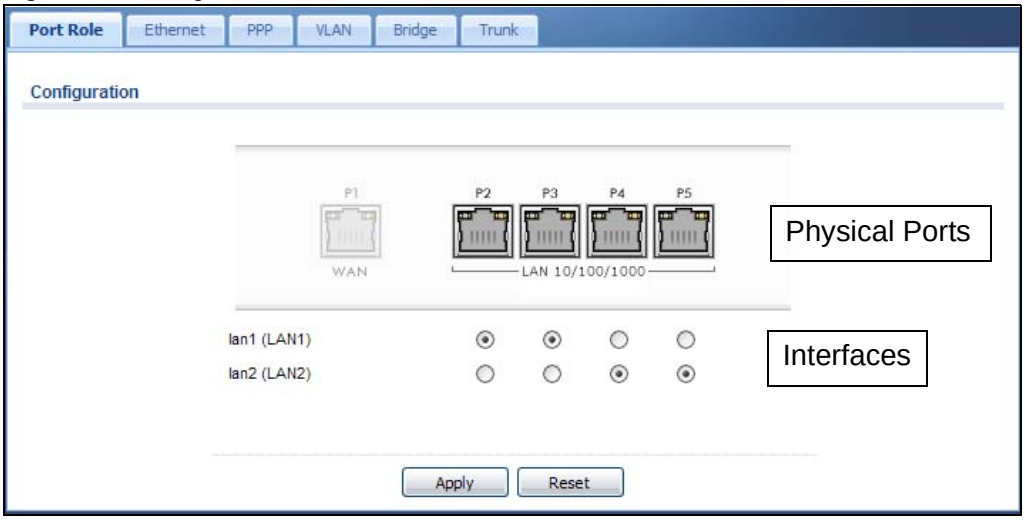
9.2 Port Role Screen

To access this screen, click **Configuration > Network > Interface > Port Role**. Use the **Port Role** screen to set the UAG's flexible ports as part of the **lan1** or **lan2** interfaces. This creates a hardware connection between the physical ports at the layer-2 (data link, MAC address) level. This provides wire-speed throughput but no security.

Not the following if you are configuring from a computer connected to a **lan1** or **lan2** port and change the port's role:

- A port's IP address varies as its role changes, make sure your computer's IP address is in the same subnet as the UAG's **lan1** or **lan2** IP address.
- Use the appropriate **lan1** or **lan2** IP address to access the UAG.

Figure 66 Configuration > Network > Interface > Port Role



The physical Ethernet ports are shown at the top and the Ethernet interfaces and zones are shown at the bottom of the screen. Use the radio buttons to select for which interface (network) you want to use each physical port. For example, select a port's lan1 radio button to use the port as part of the lan1 interface. The port will use the UAG's lan1 IP address and MAC address.

When you assign more than one physical port to a network, you create a port group. Port groups have the following characteristics:

- There is a layer-2 Ethernet switch between physical ports in the port group. This provides wire-speed throughput but no security.
- It can increase the bandwidth between the port group and other interfaces.
- The port group uses a single MAC address.

Click **Apply** to save your changes and apply them to the UAG.

Click **Reset** to change the port groups to their current configuration (last-saved values).

9.3 Ethernet Summary Screen

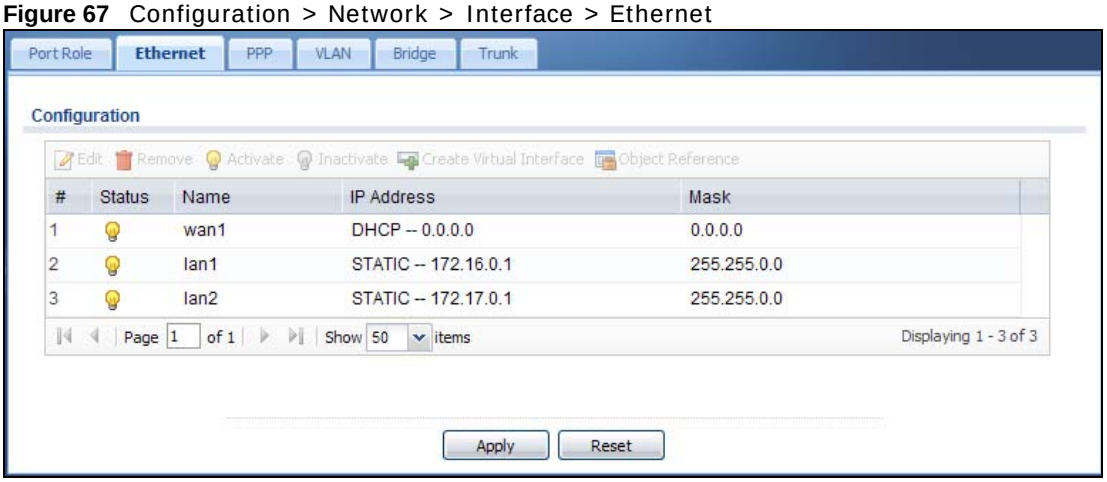
This screen lists every Ethernet interface and virtual interface created on top of Ethernet interfaces. To access this screen, click **Configuration > Network** > **Interface > Ethernet**.

Unlike other types of interfaces, you cannot create new Ethernet interfaces nor can you delete any of them. If an Ethernet interface does not have any physical ports assigned to it (see Section 9.2 on page 99), the Ethernet interface is effectively removed from the UAG, but you can still configure it.

Ethernet interfaces are similar to other types of interfaces in many ways. They have an IP address, subnet mask, and gateway used to make routing decisions. They restrict the amount of bandwidth and packet size. They can provide DHCP services, and they can verify the gateway is available.

Use Ethernet interfaces to control which physical ports exchange routing information with other routers and how much information is exchanged through each one. The more routing information is exchanged, the more efficient the routers should be. However, the routers also generate more network traffic, and some routing protocols require a significant amount of configuration and management.

Figure 67 Configuration > Network > Interface > Ethernet



Each field is described in the following table.

Table 50 Configuration > Network > Interface > Ethernet

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove a virtual interface, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an interface, select it and click **Activate**.
Inactivate	To turn off an interface, select it and click **Inactivate**.
Create Virtual Interface	To open the screen where you can create a virtual Ethernet interface, select an Ethernet interface and click **Create Virtual Interface**.
Object References	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the interface.
IP Address	This field displays the current IP address of the interface. If the IP address is 0.0.0.0 (in the IPv4 network), the interface does not have an IP address yet. In the IPv4 network, this screen also shows whether the IP address is a static IP address (**STATIC**) or dynamically assigned (**DHCP**). IP addresses are always static in virtual interfaces.
Mask	This field displays the interface's subnet mask in dot decimal notation.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

9.3.1 Ethernet Edit

The **Ethernet Edit** screen lets you configure IP address assignment, interface parameters, DHCP settings, connectivity check, and MAC address settings. To access this screen, select an entry in the **Ethernet** summary screen and click the **Edit** icon. (See Section 9.3 on page 100.)

Note: If you create IP address objects based on an interface's IP address, subnet, or gateway, the UAG automatically updates every rule or setting that uses the object whenever the interface's IP address settings change. For example, if you change the LAN's IP address, the UAG automatically updates the corresponding interface-based, LAN subnet address object.

Figure 68 Configuration > Network > Interface > Ethernet > Edit (External Type)

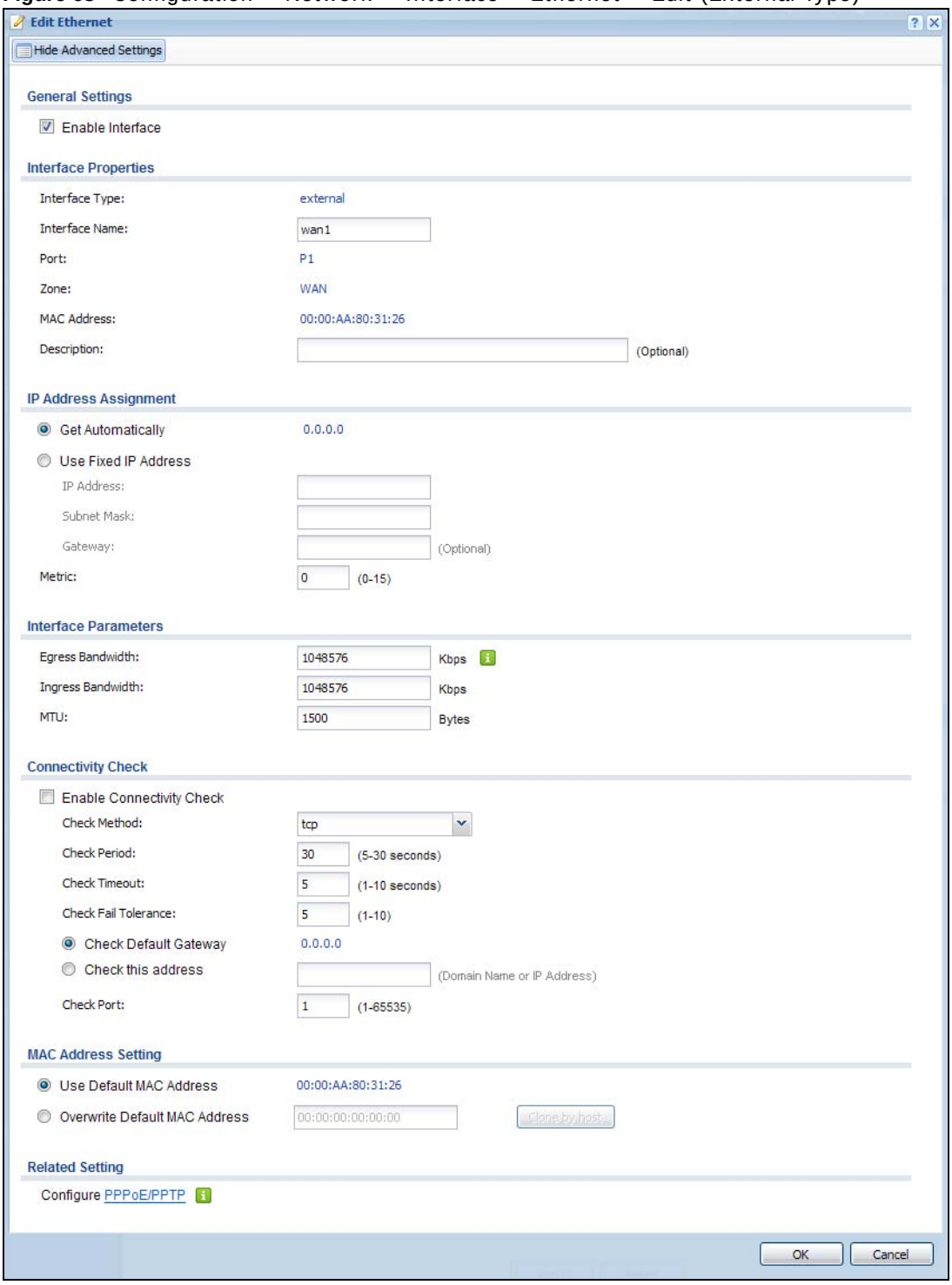
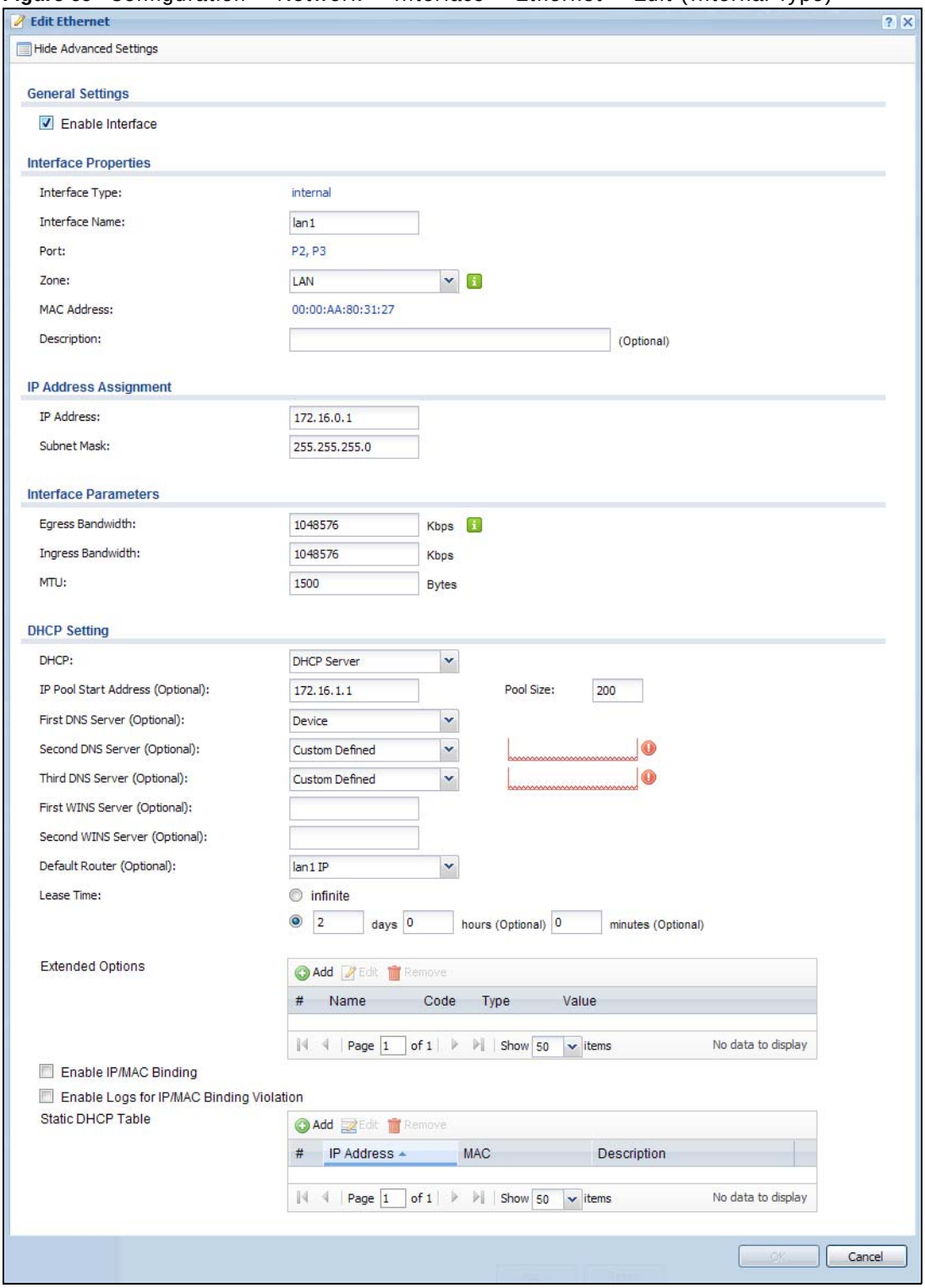


Figure 69 Configuration > Network > Interface > Ethernet > Edit (Internal Type)



This screen's fields are described in the table below.

Table 51 Configuration > Network > Interface > Ethernet > Edit

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
General Settings	
Enable Interface	Select this to enable this interface. Clear this to disable this interface.
Interface Properties	
Interface Type	**internal** is for connecting to a local network. Other corresponding configuration options: DHCP server and DHCP relay. The UAG automatically adds default SNAT settings for traffic flowing from this interface to an external interface. **external** is for connecting to an external network (like the Internet). The UAG automatically adds this interface to the default WAN trunk.
Interface Name	Specify a name for the interface. It can use alphanumeric characters, hyphens, and underscores, and it can be up to 11 characters long.
Port	This is the name of the Ethernet interface's physical port.
Zone	This is the zone to which this interface is to belong. You use zones to apply security settings such as firewall, and remote management.
MAC Address	This field is read-only. This is the MAC address that the Ethernet interface uses.
Description	Enter a description of this interface. It is not used elsewhere. You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
IP Address Assignment	These IP address fields configure an IPv4 IP address on the interface itself. If you change this IP address on the interface, you may also need to change a related address object for the network connected to the interface. For example, if you use this screen to change the IP address of your LAN interface, you should also change the corresponding LAN subnet address object.
Get Automatically	This option appears when **Interface Type** is **external**. Select this to make the interface a DHCP client and automatically get the IP address, subnet mask, and gateway address from a DHCP server.
Use Fixed IP Address	This option appears when **Interface Type** is **external**. Select this if you want to specify the IP address, subnet mask, and gateway manually.
IP Address	Enter the IP address for this interface.
Subnet Mask	Enter the subnet mask of this interface in dot decimal notation. The subnet mask indicates what part of the IP address is the same for all computers in the network.
Gateway	This option appears when **Interface Type** is **external**. Enter the IP address of the gateway. The UAG sends packets to the gateway when it does not know how to route the packet to its destination. The gateway should be on the same network as the interface.
Metric	This option appears when **Interface Type** is **external**. Enter the priority of the gateway (if any) on this interface. The UAG decides which gateway to use based on this priority. The lower the number, the higher the priority. If two or more gateways have the same priority, the UAG uses the one that was configured first.
Interface Parameters	
Egress Bandwidth	Enter the maximum amount of traffic, in kilobits per second, the UAG can send through the interface to the network. Allowed values are 0 - 1048576.
Ingress Bandwidth	This is reserved for future use. Enter the maximum amount of traffic, in kilobits per second, the UAG can receive from the network through the interface. Allowed values are 0 - 1048576.

Table 51 Configuration > Network > Interface > Ethernet > Edit (continued)

LABEL	DESCRIPTION
MTU	Maximum Transmission Unit. Type the maximum size of each data packet, in bytes, that can move through this interface. If a larger packet arrives, the UAG divides it into smaller fragments. Allowed values are 576 - 1500. Usually, this value is 1500.
Connectivity Check	These fields appear when **Interface Type** is **external**. The interface can regularly check the connection to the gateway you specified to make sure it is still available. You specify how often the interface checks the connection, how long to wait for a response before the attempt is a failure, and how many consecutive failures are required before the UAG stops routing to the gateway. The UAG resumes routing to the gateway the first time the gateway passes the connectivity check.
Enable Connectivity Check	Select this to turn on the connection check.
Check Method	Select the method that the gateway allows. Select **icmp** to have the UAG regularly ping the gateway you specify to make sure it is still available. Select **tcp** to have the UAG regularly perform a TCP handshake with the gateway you specify to make sure it is still available.
Check Period	Enter the number of seconds between connection check attempts.
Check Timeout	Enter the number of seconds to wait for a response before the attempt is a failure.
Check Fail Tolerance	Enter the number of consecutive failures before the UAG stops routing through the gateway.
Check Default Gateway	Select this to use the default gateway for the connectivity check.
Check this address	Select this to specify a domain name or IP address for the connectivity check. Enter that domain name or IP address in the field next to it.
Check Port	This field only displays when you set the **Check Method** to **tcp**. Specify the port number to use for a TCP connectivity check.
DHCP Setting	This section appears when **Interface Type** is **internal**.
DHCP	Select what type of DHCP service the UAG provides to the network. Choices are: **None** - the UAG does not provide any DHCP services. There is already a DHCP server on the network. **DHCP Relay** - the UAG routes DHCP requests to one or more DHCP servers you specify. The DHCP server(s) may be on another network. **DHCP Server** - the UAG assigns IP addresses and provides subnet mask, gateway, and DNS server information to the network. The UAG is the DHCP server for the network.
	These fields appear if the UAG is a **DHCP Relay**.
Relay Server 1	Enter the IP address of a DHCP server for the network.
Relay Server 2	This field is optional. Enter the IP address of another DHCP server for the network.
	These fields appear if the UAG is a **DHCP Server**.
IP Pool Start Address	Enter the IP address from which the UAG begins allocating IP addresses. If you want to assign a static IP address to a specific computer, use the **Static DHCP Table**. If this field is blank, the **Pool Size** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.

Table 51 Configuration > Network > Interface > Ethernet > Edit (continued)

LABEL	DESCRIPTION
Pool Size	Enter the number of IP addresses to allocate. This number must be at least one and is limited by the interface's **Subnet Mask**. For example, if the **Subnet Mask** is 255.255.255.0 and **IP Pool Start Address** is 10.10.10.10, the UAG can allocate 10.10.10.10 to 10.10.10.254, or 245 IP addresses. If this field is blank, the **IP Pool Start Address** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.
First DNS Server, Second DNS Server, Third DNS Server	Specify the IP addresses up to three DNS servers for the DHCP clients to use. Use one of the following ways to specify these IP addresses. **Custom Defined** - enter a static IP address. **From ISP** - select the DNS server that another interface received from its DHCP server. **Device** - the DHCP clients use the IP address of this interface and the UAG works as a DNS relay.
First WINS Server, Second WINS Server	Type the IP address of the WINS (Windows Internet Naming Service) server that you want to send to the DHCP clients. The WINS server keeps a mapping table of the computer names on your network and the IP addresses that they are currently using.
Default Router	If you set this interface to **DHCP Server**, you can select to use either the interface's IP address or another IP address as the default router. This default router will become the DHCP clients' default gateway. To use another IP address as the default router, select **Custom Defined** and enter the IP address.
Lease time	Specify how long each computer can use the information (especially the IP address) before it has to request the information again. Choices are: **infinite** - select this if IP addresses never expire. **days**, **hours**, and **minutes** - select this to enter how long IP addresses are valid.
Extended Options	This table is available if you selected **DHCP server**. Configure this table if you want to send more information to DHCP clients through DHCP packets.
Add	Click this to create an entry in this table. See Section 9.3.3 on page 109.
Edit	Select an entry in this table and click this to modify it.
Remove	Select an entry in this table and click this to delete it.
#	This field is a sequential value, and it is not associated with any entry.
Name	This is the name of the DHCP option.
Code	This is the code number of the DHCP option.
Type	This is the type of the set value for the DHCP option.
Value	This is the value set for the DHCP option.
Enable IP/MAC Binding	Select this option to have this interface enforce links between specific IP addresses and specific MAC addresses. This stops anyone else from manually using a bound IP address on another device connected to this interface. Use this to make use only the intended users get to use specific IP addresses.
Enable Logs for IP/MAC Binding Violation	Select this option to have the UAG generate a log if a device connected to this interface attempts to use an IP address that is bound to another device's MAC address.
Static DHCP Table	Configure a list of static IP addresses the UAG assigns to computers connected to the interface. Otherwise, the UAG assigns an IP address dynamically using the interface's **IP Pool Start Address** and **Pool Size**.

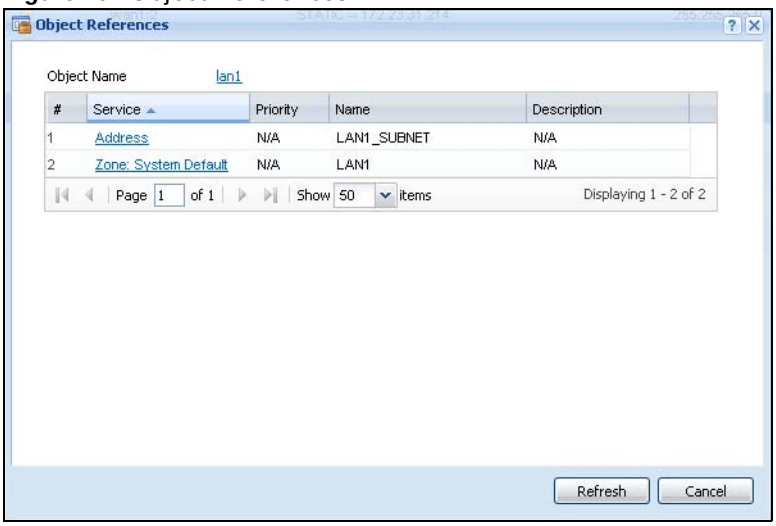
Table 51 Configuration > Network > Interface > Ethernet > Edit (continued)

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific entry.
IP Address	Enter the IP address to assign to a device with this entry's MAC address.
MAC	Enter the MAC address to which to assign this entry's IP address.
Description	Enter a description to help identify this static DHCP entry. You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 60 characters long.
MAC Address Setting	This section appears when **Interface Type** is **external**. Have the interface use either the factory assigned default MAC address, a manually specified MAC address, or clone the MAC address of another device or computer.
Use Default MAC Address	Select this option to have the interface use the factory assigned default MAC address. By default, the UAG uses the factory assigned MAC address to identify itself.
Overwrite Default MAC Address	Select this option to have the interface use a different MAC address. Either enter the MAC address in the fields or click **Clone by host** and enter the IP address of the device or computer whose MAC you are cloning. Once it is successfully configured, the address will be copied to the configuration file. It will not change unless you change the setting or upload a different configuration file.
Related Setting	
Configure PPPoE/PPTP	Click **PPPoE/PPTP** if this interface's Internet connection uses PPPoE or PPTP.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

9.3.2 Object References

When a configuration screen includes an **Object Reference** icon, select a configuration object and click **Object Reference** to open the **Object Reference** screen. This screen displays which configuration settings reference the selected object. The fields shown vary with the type of object.

Figure 70 Object References



The following table describes labels that can appear in this screen.

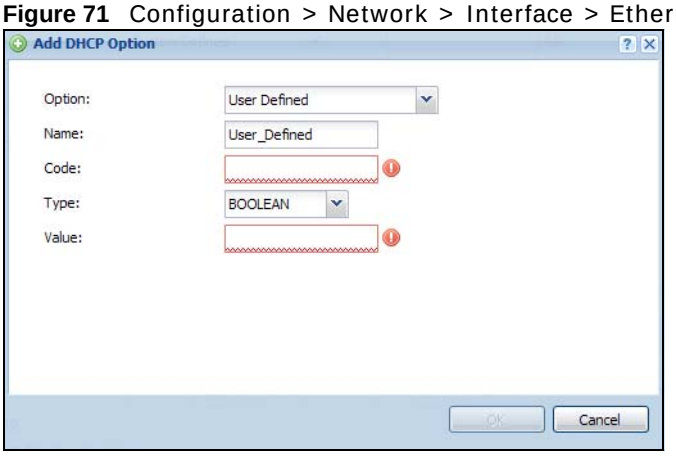
Table 52 Object References

LABEL	DESCRIPTION
Object Name	This identifies the object for which the configuration settings that use it are displayed. Click the object's name to display the object's configuration screen in the main window.
#	This field is a sequential value, and it is not associated with any entry.
Service	This is the type of setting that references the selected object. Click a service's name to display the service's configuration screen in the main window.
Priority	If it is applicable, this field lists the referencing configuration item's position in its list, otherwise **N/A** displays.
Name	This field identifies the configuration item that references the object.
Description	If the referencing configuration item has a description configured, it displays here.
Refresh	Click this to update the information in this screen.
Cancel	Click **Cancel** to close the screen.

9.3.3 Add/Edit DHCP Extended Options

When you configure an interface as a DHCPv4 server, you can additionally add DHCP extended options which have the UAG to add more information in the DHCP packets. The available fields vary depending on the DHCP option you select in this screen. To open the screen, click **Configuration > Network > Interface > Ethernet > Edit**, select **DHCP Server** in the **DHCP Setting** section, and then click **Add** or **Edit** in the **Extended Options** table.

Figure 71 Configuration > Network > Interface > Ethernet > Edit > Add/Edit Extended Options



The following table describes labels that can appear in this screen.

Table 53 Configuration > Network > Interface > Ethernet > Edit > Add/Edit Extended Options

LABEL	DESCRIPTION
Option	Select which DHCP option that you want to add in the DHCP packets sent through the interface. See Table 54 for more information.
Name	This field displays the name of the selected DHCP option. If you selected **User Defined** in the **Option** field, enter a descriptive name to identify the DHCP option. You can enter up to 16 characters ("a-z", "A-Z, "0-9", "-", and "_") with no spaces allowed. The first character must be alphabetical (a-z, A-Z).
Code	This field displays the code number of the selected DHCP option. If you selected **User Defined** in the **Option** field, enter a number for the option. This field is mandatory.

Table 53 Configuration > Network > Interface > Ethernet > Edit > Add/Edit Extended Options

LABEL	DESCRIPTION
Type	This is the type of the selected DHCP option. If you selected **User Defined** in the **Option** field, select an appropriate type for the value that you will enter in the next field. Only advanced users should configure **User Defined**. Misconfiguration could result in interface lockout.
Value	Enter the value for the selected DHCP option. For example, if you selected **TFTP Server Name (66)** and the type is **TEXT**, enter the DNS domain name of a TFTP server here. If you selected the **Time Offset (2)** option, the type is **Boolean** and you have to enter a Boolean value which should be either 0 or 1, where 1 interpreted as true and 0 is interpreted as false. This field is mandatory.
First IP Address, Second IP Address, Third IP Address	If you selected **Time Server (4)**, **NTP Server (41)**, **SIP Server (120)**, **CAPWAP AC (138)**, or **TFTP Server (150)**, you have to enter at least one IP address of the corresponding servers in these fields. The servers should be listed in order of your preference.
First Enterprise ID, Second Enterprise ID	If you selected **VIVC (124)** or **VIVS (125)**, you have to enter at least one vendor's 32-bit enterprise number in these fields. An enterprise number is a unique number that identifies a company.
First Class, Second Class	If you selected **VIVC (124)**, enter the details of the hardware configuration of the host on which the client is running, or of industry consortium compliance.
First Information, Second Information	If you selected **VIVS (125)**, enter additional information for the corresponding enterprise number in these fields.
First FQDN, Second FQDN, Third FQDN	If the **Type** is **FQDN**, you have to enter at least one domain name of the corresponding servers in these fields. The servers should be listed in order of your preference.
OK	Click this to close this screen and update the settings to the previous Edit screen.
Cancel	Click **Cancel** to close the screen.

The following table lists the available DHCP extended options (defined in RFCs) on the UAG. See RFCs for more information.

Table 54 DHCP Extended Options

OPTION NAME	CODE	DESCRIPTION
Time Offset	2	This option specifies the offset of the client's subnet in seconds from Coordinated Universal Time (UTC).
Time Server	4	This option specifies a list of Time servers available to the client.
NTP Server	42	This option specifies a list of the NTP servers available to the client by IP address.
TFTP Server Name	66	This option is used to identify a TFTP server when the "sname" field in the DHCP header has been used for DHCP options. The minimum length of the value is 1.
Bootfile	67	This option is used to identify a bootfile when the "file" field in the DHCP header has been used for DHCP options. The minimum length of the value is 1.
SIP Server	120	This option carries either an IPv4 address or a DNS domain name to be used by the SIP client to locate a SIP server.
VIVC	124	Vendor-Identifying Vendor Class option A DHCP client may use this option to unambiguously identify the vendor that manufactured the hardware on which the client is running, the software in use, or an industry consortium to which the vendor belongs.

Table 54 DHCP Extended Options (continued)

OPTION NAME	CODE	DESCRIPTION
VIVS	125	Vendor-Identifying Vendor-Specific option DHCP clients and servers may use this option to exchange vendor-specific information.
CAPWAP AC	138	CAPWAP Access Controller addresses option The Control And Provisioning of Wireless Access Points Protocol allows a Wireless Termination Point (WTP) to use DHCP to discover the Access Controllers to which it is to connect. This option carries a list of IPv4 addresses indicating one or more CAPWAP ACs available to the WTP.
TFTP Server	150	The option contains one or more IPv4 addresses that the client may use. The current use of this option is for downloading configuration from a VoIP server via TFTP; however, the option may be used for purposes other than contacting a VoIP configuration server.

9.4 PPP Interfaces

Use PPPoE/PPTP interfaces to connect to your ISP. This way, you do not have to install or manage PPPoE/PPTP software on each computer in the network.

Figure 72 Example: PPPoE/PPTP Interfaces

PPPoE/PPTP interfaces are similar to other interfaces in some ways. They have an IP address, subnet mask, and gateway used to make routing decisions; they restrict bandwidth and packet size; and they can verify the gateway is available. There are two main differences between PPPoE/PPTP interfaces and other interfaces.

- You must also configure an ISP account object for the PPPoE/PPTP interface to use.

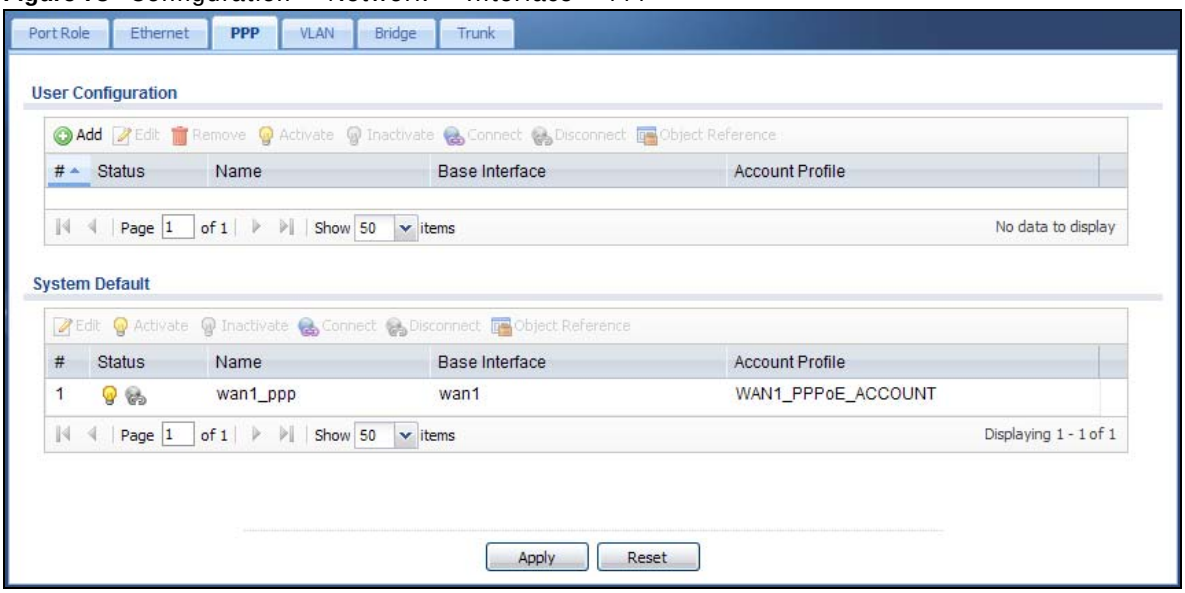
  Each ISP account specifies the protocol (PPPoE or PPTP), as well as your ISP account information. If you change ISPs later, you only have to create a new ISP account, not a new PPPoE/PPTP interface. You should not have to change any network policies.
- You do not set up the subnet mask or gateway.

  PPPoE/PPTP interfaces are interfaces between the UAG and only one computer. Therefore, the subnet mask is always 255.255.255.255. In addition, the UAG always treats the ISP as a gateway.

9.4.1 PPP Interface Summary

This screen lists every PPPoE/PPTP interface. To access this screen, click **Configuration > Network** > **Interface** > **PPP**.

Figure 73 Configuration > Network > Interface > PPP



Each field is described in the table below.

Table 55 Configuration > Network > Interface > PPP

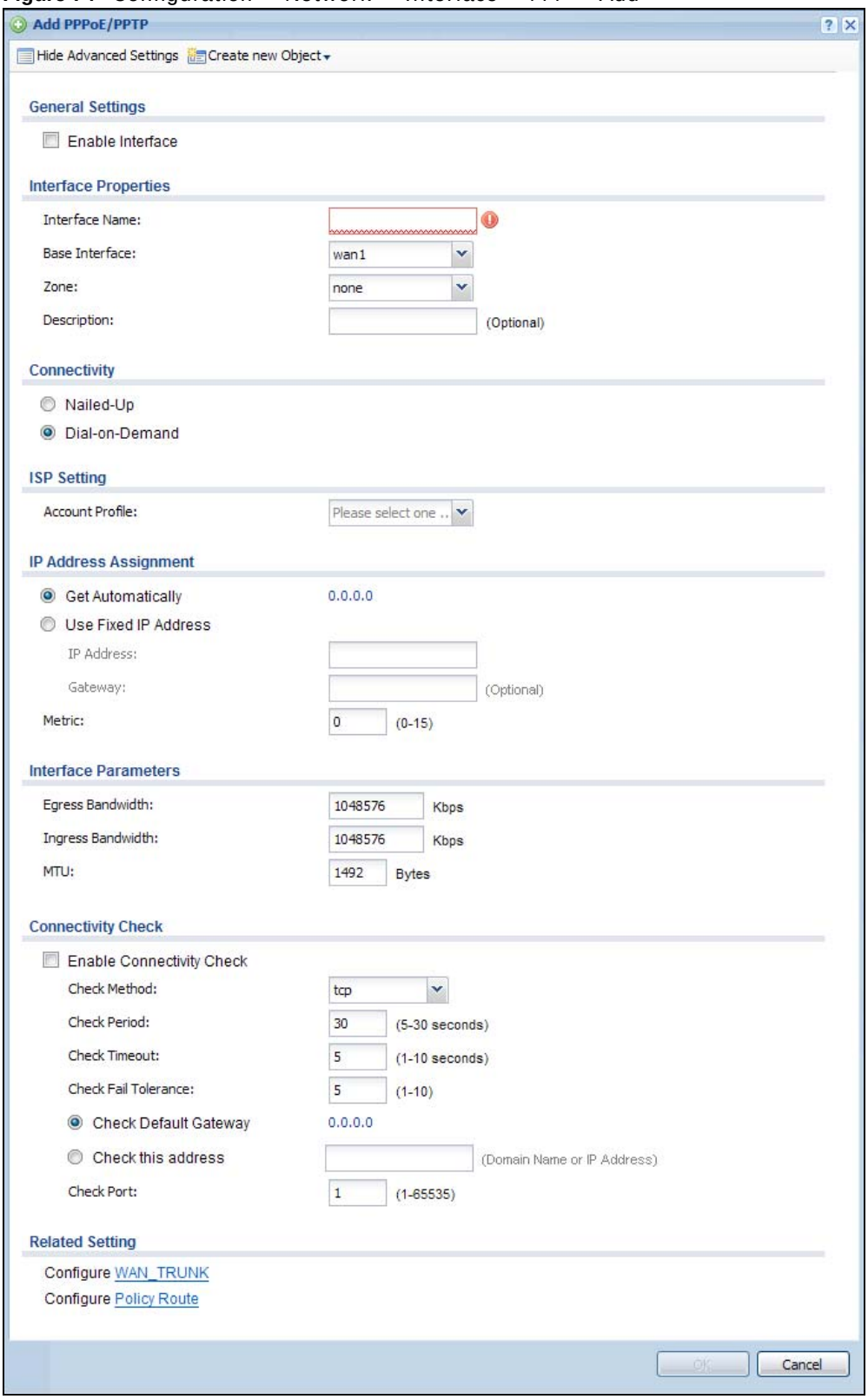
LABEL	DESCRIPTION
User Configuration / System Default	The UAG comes with the (non-removable) **System Default** PPP interfaces pre-configured. You can create (and delete) **User Configuration** PPP interfaces.
Add	Click this to create a new user-configured PPP interface.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove a user-configured PPP interface, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Connect	To connect an interface, select it and click **Connect**. You might use this in testing the interface or to manually establish the connection for a **Dial-on-Demand** PPPoE/PPTP interface.
Disconnect	To disconnect an interface, select it and click **Disconnect**. You might use this in testing the interface.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Status	The activate (light bulb) icon is lit when the entry is active and dimmed when the entry is inactive. The connect icon is lit when the interface is connected and dimmed when it is disconnected.
Name	This field displays the name of the interface.
Base Interface	This field displays the interface on the top of which the PPPoE/PPTP interface is.
Account Profile	This field displays the ISP account used by this PPPoE/PPTP interface.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

9.4.2 PPP Interface Add or Edit

Note: You have to set up an ISP account before you create a PPPoE/PPTP interface.

This screen lets you configure a PPPoE or PPTP interface. To access this screen, click the **Add** icon or select an entry in the PPP interface summary screen and click the **Edit** icon.

Figure 74 Configuration > Network > Interface > PPP > Add



Each field is explained in the following table.

Table 56 Configuration > Network > Interface > PPP > Add

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Create new object	Click this button to create an ISP Account that you may use for the ISP settings in this screen.
General Settings	
Enable Interface	Select this to enable this interface. Clear this to disable this interface.
Interface Properties	
Interface Name	Specify a name for the interface. It can use alphanumeric characters, hyphens, and underscores, and it can be up to 11 characters long.
Base Interface	Select the interface upon which this PPP interface is built. Note: Multiple PPP interfaces can use the same base interface.
Zone	Select the zone to which this PPP interface belongs. The zone determines the security settings the UAG uses for the interface.
Description	Enter a description of this interface. It is not used elsewhere. You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
Connectivity	
Nailed-Up	Select this if the PPPoE/PPTP connection should always be up. Clear this to have the UAG establish the PPPoE/PPTP connection only when there is traffic. You might use this option if a lot of traffic needs to go through the interface or it does not cost extra to keep the connection up all the time.
Dial-on-Demand	Select this to have the UAG establish the PPPoE/PPTP connection only when there is traffic. You might use this option if there is little traffic through the interface or if it costs money to keep the connection available.
ISP Setting	
Account Profile	Select the ISP account that this PPPoE/PPTP interface uses. The drop-down box lists ISP accounts by name. Use **Create new Object** if you need to configure a new ISP account (see Chapter 38 on page 341 for details).
Protocol	This field is read-only. It displays the protocol specified in the ISP account.
User Name	This field is read-only. It displays the user name for the ISP account.
Service Name	This field is read-only. It displays the PPPoE service name specified in the ISP account. This field is not available if the ISP account uses PPTP.
Server IP	This field is read-only. It displays the IP address of the PPTP server specified in the ISP account. This field is not available if the ISP account uses PPPoE.
Connection ID	This field is read-only. It displays the identification name for the PPTP server specified in the ISP account. This field is not available if the ISP account uses PPPoE.
IP Address Assignment	Click **Show Advanced Settings** to display more settings. Click **Hide Advanced Settings** to display fewer settings.
Get Automatically	Select this if this interface is a DHCP client. In this case, the DHCP server configures the IP address automatically. The subnet mask and gateway are always defined automatically in PPPoE/PPTP interfaces.
Use Fixed IP Address	Select this if you want to specify the IP address manually.

Table 56 Configuration > Network > Interface > PPP > Add (continued)

LABEL	DESCRIPTION
IP Address	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address for this interface.
Gateway	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address of the gateway. The UAG sends packets to the gateway when it does not know how to route the packet to its destination. The gateway should be on the same network as the interface.
Metric	Enter the priority of the gateway (the ISP) on this interface. The UAG decides which gateway to use based on this priority. The lower the number, the higher the priority. If two or more gateways have the same priority, the UAG uses the one that was configured first.
Interface Parameters	
Egress Bandwidth	Enter the maximum amount of traffic, in kilobits per second, the UAG can send through the interface to the network. Allowed values are 0 - 1048576.
Ingress Bandwidth	This is reserved for future use. Enter the maximum amount of traffic, in kilobits per second, the UAG can receive from the network through the interface. Allowed values are 0 - 1048576.
MTU	Maximum Transmission Unit. Type the maximum size of each data packet, in bytes, that can move through this interface. If a larger packet arrives, the UAG divides it into smaller fragments. Allowed values are 576 - 1492. Usually, this value is 1492.
Connectivity Check	The interface can regularly check the connection to the gateway you specified to make sure it is still available. You specify how often the interface checks the connection, how long to wait for a response before the attempt is a failure, and how many consecutive failures are required before the UAG stops routing to the gateway. The UAG resumes routing to the gateway the first time the gateway passes the connectivity check.
Enable Connectivity Check	Select this to turn on the connection check.
Check Method	Select the method that the gateway allows. Select **icmp** to have the UAG regularly ping the gateway you specify to make sure it is still available. Select **tcp** to have the UAG regularly perform a TCP handshake with the gateway you specify to make sure it is still available.
Check Period	Enter the number of seconds between connection check attempts.
Check Timeout	Enter the number of seconds to wait for a response before the attempt is a failure.
Check Fail Tolerance	Enter the number of consecutive failures before the UAG stops routing through the gateway.
Check Default Gateway	Select this to use the default gateway for the connectivity check.
Check this address	Select this to specify a domain name or IP address for the connectivity check. Enter that domain name or IP address in the field next to it.
Check Port	This field only displays when you set the **Check Method** to **tcp**. Specify the port number to use for a TCP connectivity check.
Related Setting	
Configure WAN_TRUNK	Click **WAN_TRUNK** to go to a screen where you can configure the interface as part of a WAN trunk for load balancing.
Policy Route	Click **Policy Route** to go to the screen where you can manually configure a policy route to associate traffic with this interface.

Table 56 Configuration > Network > Interface > PPP > Add (continued)

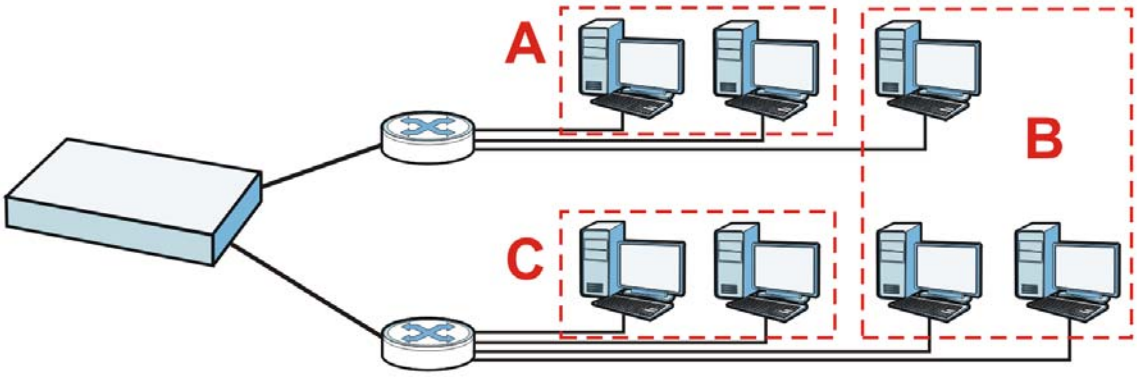
LABEL	DESCRIPTION
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

9.5 VLAN Interfaces

A Virtual Local Area Network (VLAN) divides a physical network into multiple logical networks. The standard is defined in IEEE 802.1q.

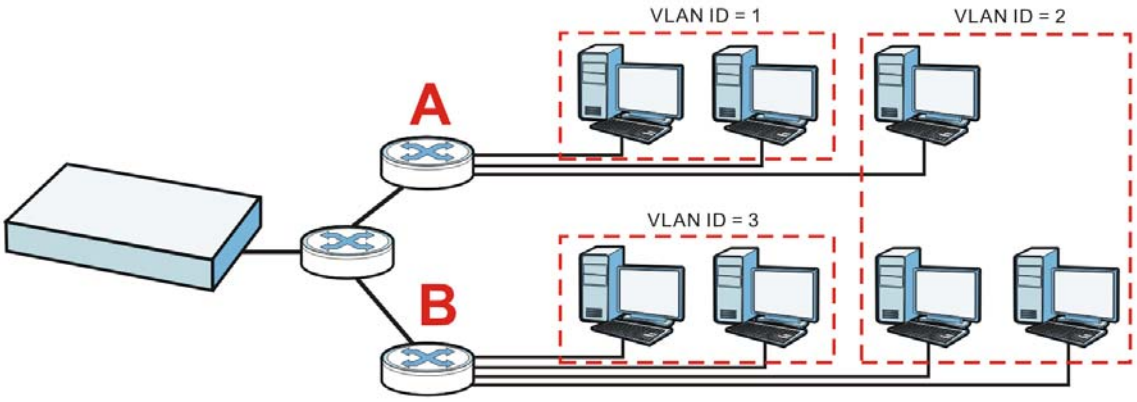
In this example, there are two physical networks and three departments **A**, **B**, and **C**. The physical networks are connected to hubs, and the hubs are connected to the router.

Figure 75 Example: Before VLAN



Alternatively, you can divide the physical networks into three VLANs.

Figure 76 Example: After VLAN



Each VLAN is a separate network with separate IP addresses, subnet masks, and gateways. Each VLAN also has a unique identification number (ID). The ID is a 12-bit value that is stored in the MAC header. The VLANs are connected to switches, and the switches are connected to the router. (If one switch has enough connections for the entire network, the network does not need switches **A** and **B**.)

- Traffic inside each VLAN is layer-2 communication (data link layer, MAC addresses). It is handled by the switches. As a result, the new switch is required to handle traffic inside VLAN 2. Traffic is only broadcast inside each VLAN, not each physical network.
- Traffic between VLANs (or between a VLAN and another type of network) is layer-3 communication (network layer, IP addresses). It is handled by the router.

This approach provides a few advantages.

- Increased performance - In VLAN 2, the extra switch should route traffic inside the sales department faster than the router does. In addition, broadcasts are limited to smaller, more logical groups of users.
- Higher security - If each computer has a separate physical connection to the switch, then broadcast traffic in each VLAN is never sent to computers in another VLAN.
- Better manageability - You can align network policies more appropriately for users. For example, you can set different bandwidth limits for each VLAN (each department in the example above). These rules are also independent of the physical network, so you can change the physical network without changing policies.

In this example, the new switch handles the following types of traffic:

- Inside VLAN 2.
- Between the router and VLAN 1.
- Between the router and VLAN 2.
- Between the router and VLAN 3.

VLAN Interfaces Overview

In the UAG, each VLAN is called a VLAN interface. As a router, the UAG routes traffic between VLAN interfaces, but it does not route traffic within a VLAN interface. All traffic for each VLAN interface can go through only one Ethernet interface, though each Ethernet interface can have one or more VLAN interfaces.

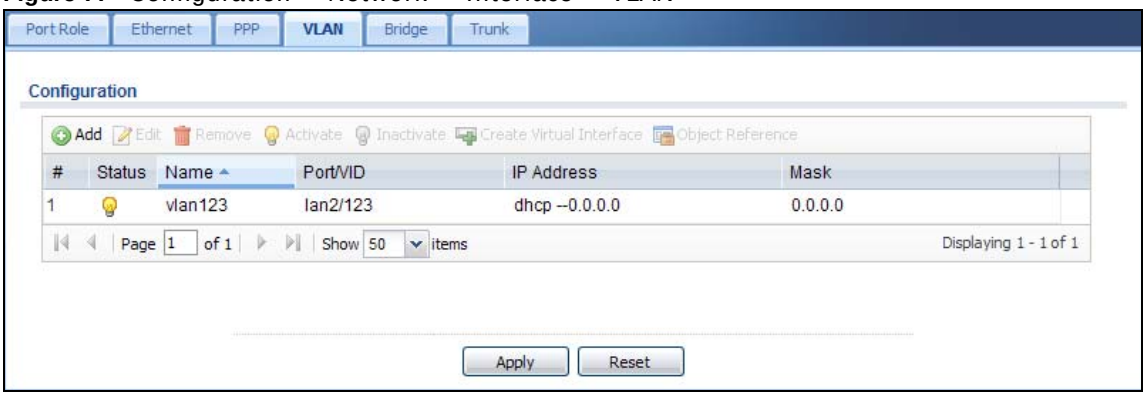
Note: Each VLAN interface is created on top of only one Ethernet interface.

Otherwise, VLAN interfaces are similar to other interfaces in many ways. They have an IP address, subnet mask, and gateway used to make routing decisions. They restrict bandwidth and packet size. They can provide DHCP services, and they can verify the gateway is available.

9.5.1 VLAN Interface Summary Screen

This screen lists every VLAN interface and virtual interface created on top of VLAN interfaces. To access this screen, click **Configuration > Network > Interface** > **VLAN**.

Figure 77 Configuration > Network > Interface > VLAN



Each field is explained in the following table.

Table 57 Configuration > Network > Interface > VLAN

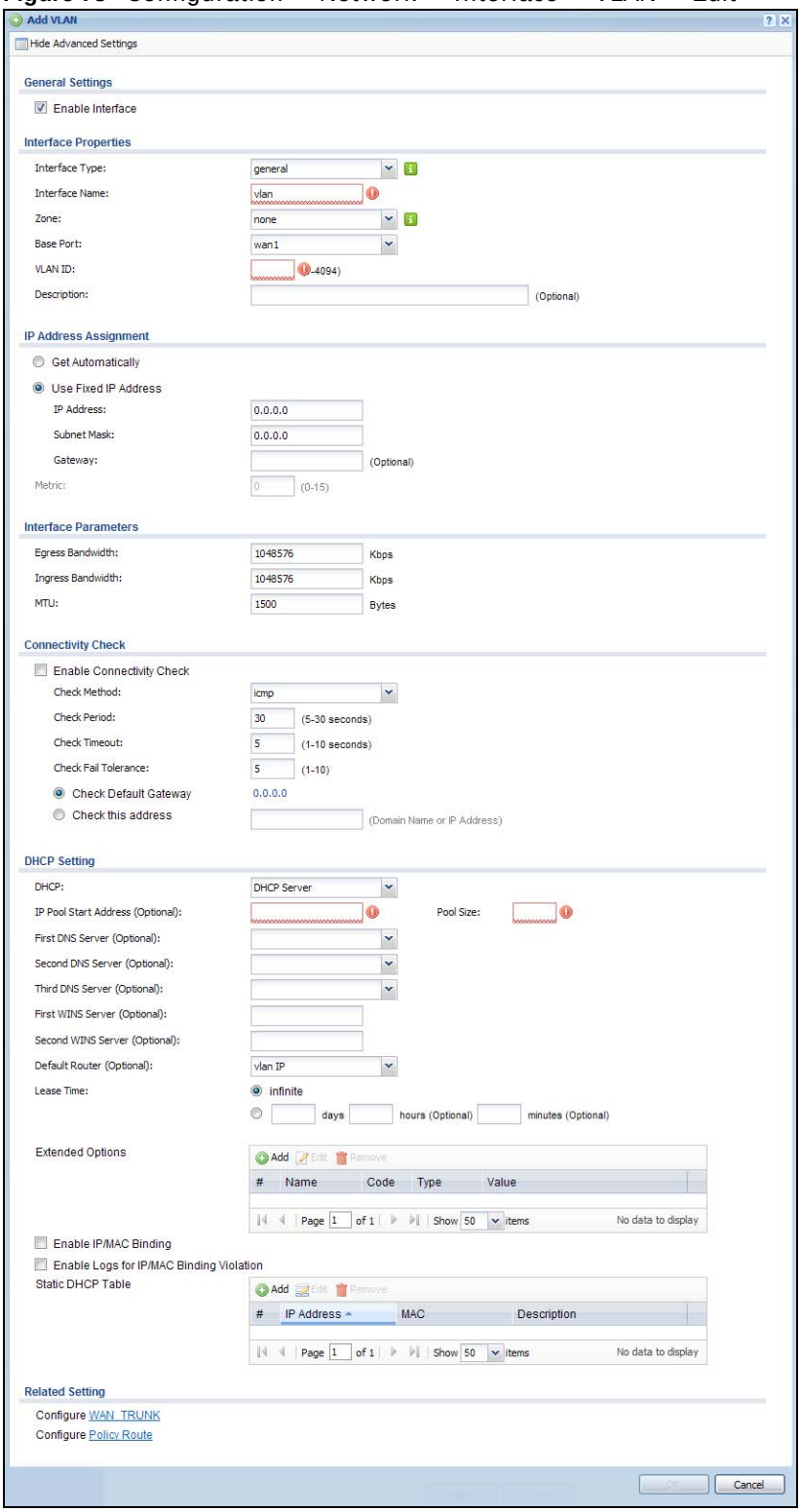
LABEL	DESCRIPTION
Add	Click this to create a new VLAN interface.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Create Virtual Interface	To open the screen where you can create a virtual interface, select an interface and click **Create Virtual Interface**.
Object References	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the interface.
Port/VID	For VLAN interfaces, this field displays • the Ethernet interface on which the VLAN interface is created • the VLAN ID For virtual interfaces, this field is blank.
IP Address	This field displays the current IP address of the interface. If the IP address is 0.0.0.0, the interface does not have an IP address yet. This screen also shows whether the IP address is a static IP address (**static**) or dynamically assigned (**dhcp**). IP addresses are always static in virtual interfaces.
Mask	This field displays the interface's subnet mask in dot decimal notation.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

9.5.2 VLAN Interface Add/Edit

This screen lets you configure IP address assignment, interface bandwidth parameters, DHCP settings, and connectivity check for each VLAN interface. To access this screen, click the **Add** icon

or select an entry in the **VLAN** summary screen and click the **Edit** icon. The following screen appears.

Figure 78 Configuration > Network > Interface > VLAN > Edit



Each field is explained in the following table.

Table 58 Configuration > Network > Interface > VLAN > Edit

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
General Settings	
Enable Interface	Select this to turn this interface on. Clear this to disable this interface.
Interface Properties	
Interface Type	Select one of the following option depending on the type of network to which the UAG is connected or if you want to additionally manually configure some related settings. **internal** is for connecting to a local network. Other corresponding configuration options: DHCP server and DHCP relay. The UAG automatically adds default SNAT settings for traffic flowing from this interface to an external interface. **external** is for connecting to an external network (like the Internet). The UAG automatically adds this interface to the default WAN trunk. For **general**, the rest of the screen's options do not automatically adjust and you must manually configure a policy route to add routing and SNAT settings for the interface.
Interface Name	This field is read-only if you are editing an existing VLAN interface. Enter the number of the VLAN interface. You can use a number from 0~4094. For example, vlan0, vlan8, and so on. The total number of VLANs you can configure on the UAG depends on the model.
Zone	Select the zone to which the VLAN interface belongs.
Base Port	Select the Ethernet interface on which the VLAN interface runs.
VLAN ID	Enter the VLAN ID. This 12-bit number uniquely identifies each VLAN. Allowed values are 1 - 4094. (0 and 4095 are reserved.)
Description	Enter a description of this interface. It is not used elsewhere. You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
IP Address Assignment	
Get Automatically	Select this if this interface is a DHCP client. In this case, the DHCP server configures the IP address, subnet mask, and gateway automatically.
Use Fixed IP Address	Select this if you want to specify the IP address, subnet mask, and gateway manually.
IP Address	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address for this interface.
Subnet Mask	This field is enabled if you select **Use Fixed IP Address**. Enter the subnet mask of this interface in dot decimal notation. The subnet mask indicates what part of the IP address is the same for all computers in the network.
Gateway	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address of the gateway. The UAG sends packets to the gateway when it does not know how to route the packet to its destination. The gateway should be on the same network as the interface.
Metric	Enter the priority of the gateway (if any) on this interface. The UAG decides which gateway to use based on this priority. The lower the number, the higher the priority. If two or more gateways have the same priority, the UAG uses the one that was configured first.
Interface Parameters	

Table 58 Configuration > Network > Interface > VLAN > Edit (continued)

LABEL	DESCRIPTION
Egress Bandwidth	Enter the maximum amount of traffic, in kilobits per second, the UAG can send through the interface to the network. Allowed values are 0 - 1048576.
Ingress Bandwidth	This is reserved for future use. Enter the maximum amount of traffic, in kilobits per second, the UAG can receive from the network through the interface. Allowed values are 0 - 1048576.
MTU	Maximum Transmission Unit. Type the maximum size of each data packet, in bytes, that can move through this interface. If a larger packet arrives, the UAG divides it into smaller fragments. Allowed values are 576 - 1500. Usually, this value is 1500.
Connectivity Check	The UAG can regularly check the connection to the gateway you specified to make sure it is still available. You specify how often to check the connection, how long to wait for a response before the attempt is a failure, and how many consecutive failures are required before the UAG stops routing to the gateway. The UAG resumes routing to the gateway the first time the gateway passes the connectivity check.
Enable Connectivity Check	Select this to turn on the connection check.
Check Method	Select the method that the gateway allows. Select **icmp** to have the UAG regularly ping the gateway you specify to make sure it is still available. Select **tcp** to have the UAG regularly perform a TCP handshake with the gateway you specify to make sure it is still available.
Check Period	Enter the number of seconds between connection check attempts.
Check Timeout	Enter the number of seconds to wait for a response before the attempt is a failure.
Check Fail Tolerance	Enter the number of consecutive failures before the UAG stops routing through the gateway.
Check Default Gateway	Select this to use the default gateway for the connectivity check.
Check this address	Select this to specify a domain name or IP address for the connectivity check. Enter that domain name or IP address in the field next to it.
Check Port	This field only displays when you set the **Check Method** to **tcp**. Specify the port number to use for a TCP connectivity check.
DHCP Setting	The DHCP settings are available for the LAN interfaces.
DHCP	Select what type of DHCP service the UAG provides to the network. Choices are: **None** - the UAG does not provide any DHCP services. There is already a DHCP server on the network. **DHCP Relay** - the UAG routes DHCP requests to one or more DHCP servers you specify. The DHCP server(s) may be on another network. **DHCP Server** - the UAG assigns IP addresses and provides subnet mask, gateway, and DNS server information to the network. The UAG is the DHCP server for the network.
	These fields appear if the UAG is a **DHCP Relay**.
Relay Server 1	Enter the IP address of a DHCP server for the network.
Relay Server 2	This field is optional. Enter the IP address of another DHCP server for the network.
	These fields appear if the UAG is a **DHCP Server**.

Table 58 Configuration > Network > Interface > VLAN > Edit (continued)

LABEL	DESCRIPTION
IP Pool Start Address	Enter the IP address from which the UAG begins allocating IP addresses. If you want to assign a static IP address to a specific computer, click **Add Static DHCP**. If this field is blank, the **Pool Size** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.
Pool Size	Enter the number of IP addresses to allocate. This number must be at least one and is limited by the interface's **Subnet Mask**. For example, if the **Subnet Mask** is 255.255.255.0 and **IP Pool Start Address** is 10.10.10.10, the UAG can allocate 10.10.10.10 to 10.10.10.254, or 245 IP addresses. If this field is blank, the **IP Pool Start Address** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.
First DNS Server Second DNS Server Third DNS Server	Specify the IP addresses up to three DNS servers for the DHCP clients to use. Use one of the following ways to specify these IP addresses. **Custom Defined** - enter a static IP address. **From ISP** - select the DNS server that another interface received from its DHCP server. **Device** - the DHCP clients use the IP address of this interface and the UAG works as a DNS relay.
First WINS Server, Second WINS Server	Type the IP address of the WINS (Windows Internet Naming Service) server that you want to send to the DHCP clients. The WINS server keeps a mapping table of the computer names on your network and the IP addresses that they are currently using.
Default Router	If you set this interface to **DHCP Server**, you can select to use either the interface's IP address or another IP address as the default router. This default router will become the DHCP clients' default gateway. To use another IP address as the default router, select **Custom Defined** and enter the IP address.
Lease time	Specify how long each computer can use the information (especially the IP address) before it has to request the information again. Choices are: **infinite** - select this if IP addresses never expire. **days**, **hours**, and **minutes** - select this to enter how long IP addresses are valid.
Extended Options	This table is available if you selected **DHCP server**. Configure this table if you want to send more information to DHCP clients through DHCP packets.
Add	Click this to create an entry in this table. See Section 9.3.3 on page 109.
Edit	Select an entry in this table and click this to modify it.
Remove	Select an entry in this table and click this to delete it.
#	This field is a sequential value, and it is not associated with any entry.
Name	This is the name of the DHCP option.
Code	This is the code number of the DHCP option.
Type	This is the type of the set value for the DHCP option.
Value	This is the value set for the DHCP option.
Enable IP/MAC Binding	Select this option to have the UAG enforce links between specific IP addresses and specific MAC addresses for this VLAN. This stops anyone else from manually using a bound IP address on another device connected to this interface. Use this to make use only the intended users get to use specific IP addresses.

Table 58 Configuration > Network > Interface > VLAN > Edit (continued)

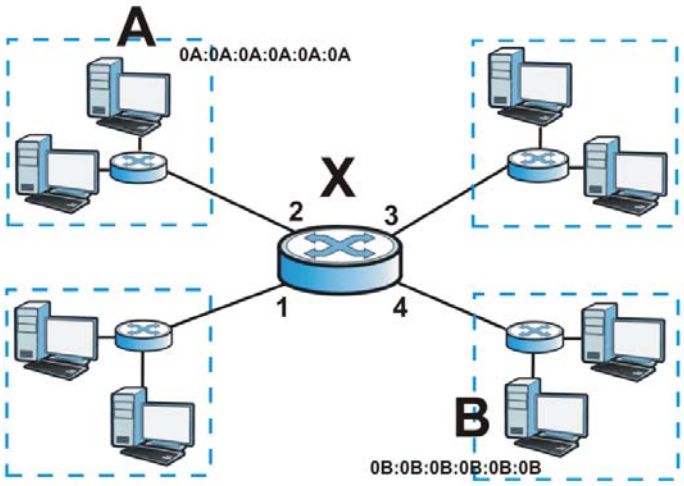
LABEL	DESCRIPTION
Enable Logs for IP/MAC Binding Violation	Select this option to have the UAG generate a log if a device connected to this VLAN attempts to use an IP address that is bound to another device's MAC address.
Static DHCP Table	Configure a list of static IP addresses the UAG assigns to computers connected to the interface. Otherwise, the UAG assigns an IP address dynamically using the interface's **IP Pool Start Address** and **Pool Size**.
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific entry.
IP Address	Enter the IP address to assign to a device with this entry's MAC address.
MAC	Enter the MAC address to which to assign this entry's IP address.
Description	Enter a description to help identify this static DHCP entry. You can use alphanumeric and ( )+/:=?!*#@$_%- characters, and it can be up to 60 characters long.
Related Setting	
Configure WAN_TRUNK	Click **WAN_TRUNK** to go to a screen where you can set this VLAN to be part of a WAN trunk for load balancing.
Configure Policy Route	Click **Policy Route** to go to the screen where you can manually configure a policy route to associate traffic with this VLAN.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

9.6 Bridge Interfaces

This section introduces bridges and bridge interfaces and then explains the screens for bridge interfaces.

Bridge Overview

A bridge creates a connection between two or more network segments at the layer-2 (MAC address) level. In the following example, bridge **X** connects four network segments.



When the bridge receives a packet, the bridge records the source MAC address and the port on which it was received in a table. It also looks up the destination MAC address in the table. If the bridge knows on which port the destination MAC address is located, it sends the packet to that port. If the destination MAC address is not in the table, the bridge broadcasts the packet on every port (except the one on which it was received).

In the example above, computer A sends a packet to computer B. Bridge X records the source address 0A:0A:0A:0A:0A:0A and port 2 in the table. It also looks up 0B:0B:0B:0B:0B:0B in the table. There is no entry yet, so the bridge broadcasts the packet on ports 1, 3, and 4.

Table 59 Example: Bridge Table After Computer A Sends a Packet to Computer B

MAC ADDRESS	PORT
0A:0A:0A:0A:0A:0A	2

If computer B responds to computer A, bridge X records the source address 0B:0B:0B:0B:0B:0B and port 4 in the table. It also looks up 0A:0A:0A:0A:0A:0A in the table and sends the packet to port 2 accordingly.

Table 60 Example: Bridge Table After Computer B Responds to Computer A

MAC ADDRESS	PORT
0A:0A:0A:0A:0A:0A	2
0B:0B:0B:0B:0B:0B	4

Bridge Interface Overview

A bridge interface creates a software bridge between the members of the bridge interface. It also becomes the UAG's interface for the resulting network.

This UAG can bridge traffic between some interfaces while it routes traffic for other interfaces. The bridge interfaces also support more functions, like interface bandwidth parameters, DHCP settings, and connectivity check. To use the whole UAG as a transparent bridge, add all of the UAG's interfaces to a bridge interface.

A bridge interface may consist of the following members:

- Zero or one VLAN interfaces (and any associated virtual VLAN interfaces)
- Any number of Ethernet interfaces (and any associated virtual Ethernet interfaces)

When you create a bridge interface, the UAG removes the members' entries from the routing table and adds the bridge interface's entries to the routing table. For example, this table shows the routing table before and after you create bridge interface br0 (250.250.250.0/23) between lan1 and vlan1.

Table 61 Example: Routing Table Before and After Bridge Interface br0 Is Created

IP ADDRESS(ES)	DESTINATION
210.210.210.0/24	lan1
210.211.1.0/24	lan1:1
221.221.221.0/24	vlan0
222.222.222.0/24	vlan1
230.230.230.192/26	wan1

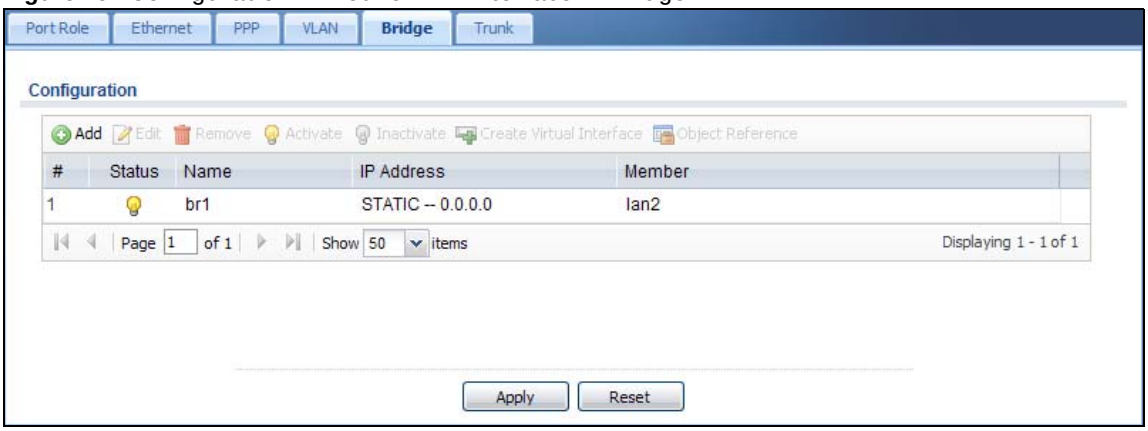
IP ADDRESS(ES)	DESTINATION
221.221.221.0/24	vlan0
230.230.230.192/26	wan1
250.250.250.0/23	br0

In this example, virtual Ethernet interface lan1:1 is also removed from the routing table when lan1 is added to br0. Virtual interfaces are automatically added to or remove from a bridge interface when the underlying interface is added or removed.

9.6.1 Bridge Interface Summary

This screen lists every bridge interface and virtual interface created on top of bridge interfaces. To access this screen, click **Configuration** > **Network** > **Interface** > **Bridge**.

Figure 79 Configuration > Network > Interface > Bridge



Each field is described in the following table.

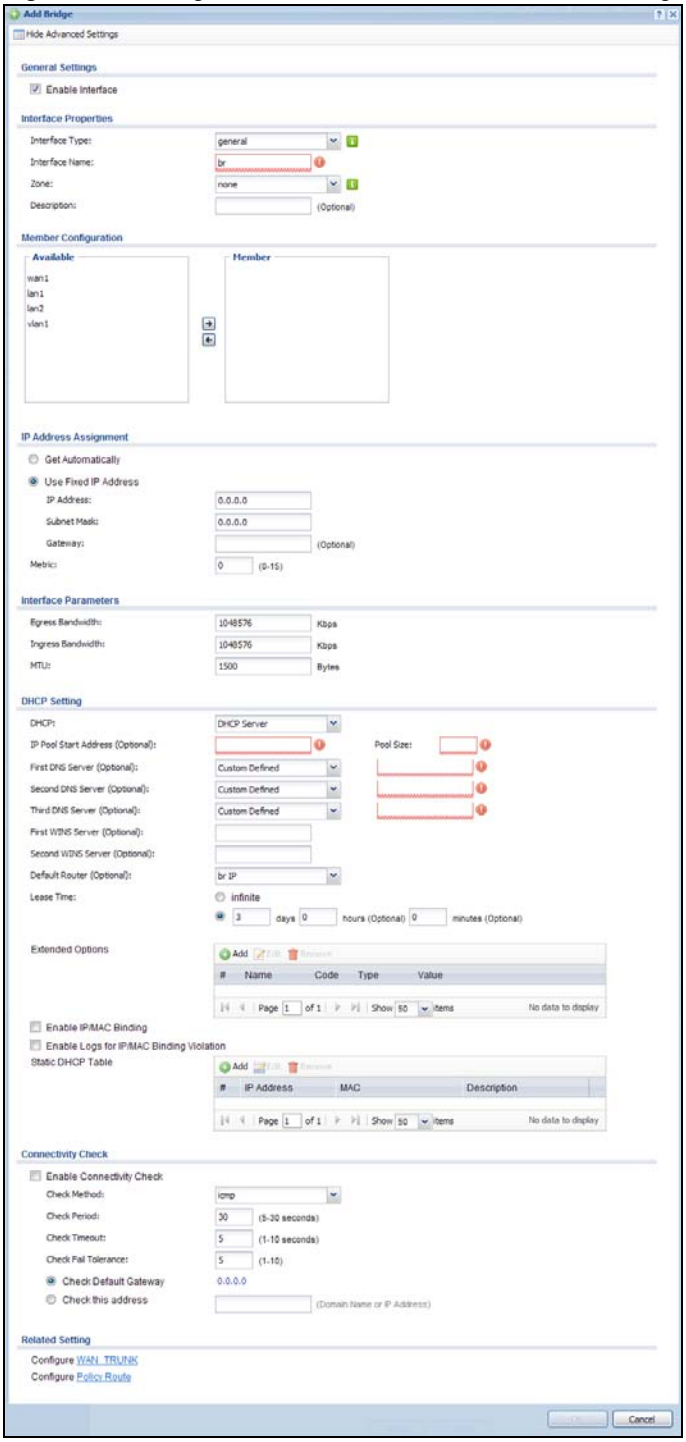
Table 62 Configuration > Network > Interface > Bridge

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Create Virtual Interface	To open the screen where you can create a virtual interface, select an interface and click **Create Virtual Interface**.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the interface.
IP Address	This field displays the current IP address of the interface. If the IP address is 0.0.0.0, the interface does not have an IP address yet. This screen also shows whether the IP address is a static IP address (**STATIC**) or dynamically assigned (**DHCP**). IP addresses are always static in virtual interfaces.
Member	This field displays the Ethernet interfaces and VLAN interfaces in the bridge interface. It is blank for virtual interfaces.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

9.6.2 Bridge Interface Add/Edit

This screen lets you configure IP address assignment, interface bandwidth parameters, DHCP settings, and connectivity check for each bridge interface. To access this screen, click the **Add** icon, or select an entry in the **Bridge** summary screen and click the **Edit** icon. The following screen appears.

Figure 80 Configuration > Network > Interface > Bridge > Add



Each field is described in the table below.

Table 63 Configuration > Network > Interface > Bridge > Edit

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
General Settings	
Enable Interface	Select this to enable this interface. Clear this to disable this interface.
Interface Properties	
Interface Type	Select one of the following option depending on the type of network to which the UAG is connected or if you want to additionally manually configure some related settings. **internal** is for connecting to a local network. Other corresponding configuration options: DHCP server and DHCP relay. The UAG automatically adds default SNAT settings for traffic flowing from this interface to an external interface. **external** is for connecting to an external network (like the Internet). The UAG automatically adds this interface to the default WAN trunk. For **general**, the rest of the screen's options do not automatically adjust and you must manually configure a policy route to add routing and SNAT settings for the interface.
Interface Name	This field is read-only if you are editing the interface. Enter the name of the bridge interface. The format is br*x*, where *x* is 0 - 11. For example, br0, br3, and so on.
Zone	Select the zone to which the interface is to belong. You use zones to apply security settings such as firewall, and remote management.
Description	Enter a description of this interface. It is not used elsewhere. You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
Member Configuration	
Available	This field displays Ethernet interfaces and VLAN interfaces that can become part of the bridge interface. An interface is not available in the following situations: • There is a virtual interface on top of it • It is already used in a different bridge interface Select one, and click the **>>** arrow to add it to the bridge interface. Each bridge interface can only have one VLAN interface.
Member	This field displays the interfaces that are part of the bridge interface. Select one, and click the **<<** arrow to remove it from the bridge interface.
IP Address Assignment	
Get Automatically	Select this if this interface is a DHCP client. In this case, the DHCP server configures the IP address, subnet mask, and gateway automatically.
Use Fixed IP Address	Select this if you want to specify the IP address, subnet mask, and gateway manually.
IP Address	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address for this interface.
Subnet Mask	This field is enabled if you select **Use Fixed IP Address**. Enter the subnet mask of this interface in dot decimal notation. The subnet mask indicates what part of the IP address is the same for all computers in the network.
Gateway	This field is enabled if you select **Use Fixed IP Address**. Enter the IP address of the gateway. The UAG sends packets to the gateway when it does not know how to route the packet to its destination. The gateway should be on the same network as the interface.

Table 63 Configuration > Network > Interface > Bridge > Edit (continued)

LABEL	DESCRIPTION
Metric	Enter the priority of the gateway (if any) on this interface. The UAG decides which gateway to use based on this priority. The lower the number, the higher the priority. If two or more gateways have the same priority, the UAG uses the one that was configured first.
Interface Parameters	
Egress Bandwidth	Enter the maximum amount of traffic, in kilobits per second, the UAG can send through the interface to the network. Allowed values are 0 - 1048576.
Ingress Bandwidth	This is reserved for future use. Enter the maximum amount of traffic, in kilobits per second, the UAG can receive from the network through the interface. Allowed values are 0 - 1048576.
MTU	Maximum Transmission Unit. Type the maximum size of each data packet, in bytes, that can move through this interface. If a larger packet arrives, the UAG divides it into smaller fragments. Allowed values are 576 - 1500. Usually, this value is 1500.
DHCP Setting	
DHCP	Select what type of DHCP service the UAG provides to the network. Choices are: **None** - the UAG does not provide any DHCP services. There is already a DHCP server on the network. **DHCP Relay** - the UAG routes DHCP requests to one or more DHCP servers you specify. The DHCP server(s) may be on another network. **DHCP Server** - the UAG assigns IP addresses and provides subnet mask, gateway, and DNS server information to the network. The UAG is the DHCP server for the network.
	These fields appear if the UAG is a **DHCP Relay**.
Relay Server 1	Enter the IP address of a DHCP server for the network.
Relay Server 2	This field is optional. Enter the IP address of another DHCP server for the network.
	These fields appear if the UAG is a **DHCP Server**.
IP Pool Start Address	Enter the IP address from which the UAG begins allocating IP addresses. If you want to assign a static IP address to a specific computer, click **Add Static DHCP**. If this field is blank, the **Pool Size** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.
Pool Size	Enter the number of IP addresses to allocate. This number must be at least one and is limited by the interface's **Subnet Mask**. For example, if the **Subnet Mask** is 255.255.255.0 and **IP Pool Start Address** is 10.10.10.10, the UAG can allocate 10.10.10.10 to 10.10.10.254, or 245 IP addresses. If this field is blank, the **IP Pool Start Address** must also be blank. In this case, the UAG can assign every IP address allowed by the interface's IP address and subnet mask, except for the first address (network address), last address (broadcast address) and the interface's IP address.
First DNS Server Second DNS Server Third DNS Server	Specify the IP addresses up to three DNS servers for the DHCP clients to use. Use one of the following ways to specify these IP addresses. **Custom Defined** - enter a static IP address. **From ISP** - select the DNS server that another interface received from its DHCP server. **Device** - the DHCP clients use the IP address of this interface and the UAG works as a DNS relay.

Table 63 Configuration > Network > Interface > Bridge > Edit (continued)

LABEL	DESCRIPTION
First WINS Server, Second WINS Server	Type the IP address of the WINS (Windows Internet Naming Service) server that you want to send to the DHCP clients. The WINS server keeps a mapping table of the computer names on your network and the IP addresses that they are currently using.
Default Router	If you set this interface to **DHCP Server**, you can select to use either the interface's IP address or another IP address as the default router. This default router will become the DHCP clients' default gateway. To use another IP address as the default router, select **Custom Defined** and enter the IP address.
Lease time	Specify how long each computer can use the information (especially the IP address) before it has to request the information again. Choices are: **infinite** - select this if IP addresses never expire **days**, **hours**, and **minutes** - select this to enter how long IP addresses are valid.
Extended Options	This table is available if you selected **DHCP server**. Configure this table if you want to send more information to DHCP clients through DHCP packets.
Add	Click this to create an entry in this table. See Section 9.3.3 on page 109.
Edit	Select an entry in this table and click this to modify it.
Remove	Select an entry in this table and click this to delete it.
#	This field is a sequential value, and it is not associated with any entry.
Name	This is the name of the DHCP option.
Code	This is the code number of the DHCP option.
Type	This is the type of the set value for the DHCP option.
Value	This is the value set for the DHCP option.
Enable IP/MAC Binding	Select this option to have this interface enforce links between specific IP addresses and specific MAC addresses. This stops anyone else from manually using a bound IP address on another device connected to this interface. Use this to make use only the intended users get to use specific IP addresses.
Enable Logs for IP/MAC Binding Violation	Select this option to have the UAG generate a log if a device connected to this interface attempts to use an IP address that is bound to another device's MAC address.
Static DHCP Table	Configure a list of static IP addresses the UAG assigns to computers connected to the interface. Otherwise, the UAG assigns an IP address dynamically using the interface's **IP Pool Start Address** and **Pool Size**.
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific entry.
IP Address	Enter the IP address to assign to a device with this entry's MAC address.
MAC Address	Enter the MAC address to which to assign this entry's IP address.
Description	Enter a description to help identify this static DHCP entry. You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 60 characters long.
Connectivity Check	The interface can regularly check the connection to the gateway you specified to make sure it is still available. You specify how often the interface checks the connection, how long to wait for a response before the attempt is a failure, and how many consecutive failures are required before the UAG stops routing to the gateway. The UAG resumes routing to the gateway the first time the gateway passes the connectivity check.

Table 63 Configuration > Network > Interface > Bridge > Edit (continued)

LABEL	DESCRIPTION
Enable Connectivity Check	Select this to turn on the connection check.
Check Method	Select the method that the gateway allows. Select **icmp** to have the UAG regularly ping the gateway you specify to make sure it is still available. Select **tcp** to have the UAG regularly perform a TCP handshake with the gateway you specify to make sure it is still available.
Check Period	Enter the number of seconds between connection check attempts.
Check Timeout	Enter the number of seconds to wait for a response before the attempt is a failure.
Check Fail Tolerance	Enter the number of consecutive failures before the UAG stops routing through the gateway.
Check Default Gateway	Select this to use the default gateway for the connectivity check.
Check this address	Select this to specify a domain name or IP address for the connectivity check. Enter that domain name or IP address in the field next to it.
Check Port	This field only displays when you set the **Check Method** to **tcp**. Specify the port number to use for a TCP connectivity check.
Related Setting	
Configure WAN TRUNK	Click WAN TRUNK to go to a screen where you can configure the interface as part of a WAN trunk for load balancing.
Configure Policy Route	Click Policy Route to go to the screen where you can manually configure a policy route to associate traffic with this bridge interface.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

9.7 Virtual Interfaces

Use virtual interfaces to tell the UAG where to route packets.

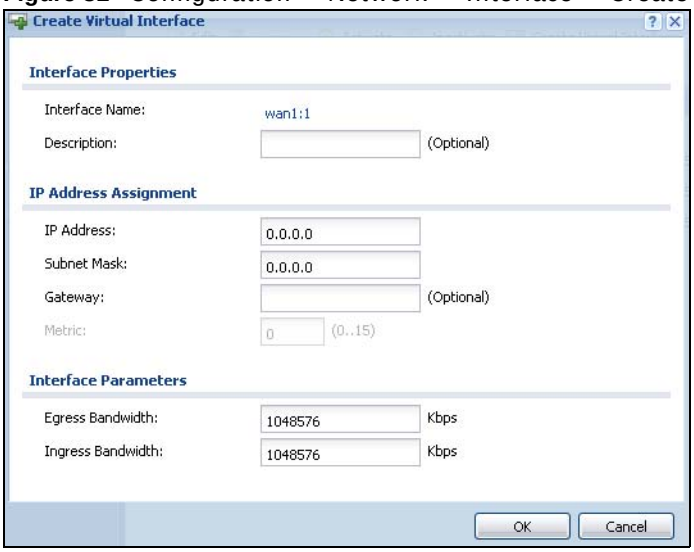
Virtual interfaces can be created on top of Ethernet interfaces, VLAN interfaces, or bridge interfaces. Virtual VLAN interfaces recognize and use the same VLAN ID. Otherwise, there is no difference between each type of virtual interface. Network policies (for example, firewall rules) that apply to the underlying interface automatically apply to the virtual interface as well.

Like other interfaces, virtual interfaces have an IP address, subnet mask, and gateway used to make routing decisions. However, you have to manually specify the IP address and subnet mask; virtual interfaces cannot be DHCP clients. Like other interfaces, you can restrict bandwidth through virtual interfaces, but you cannot change the MTU. The virtual interface uses the same MTU that the underlying interface uses. Unlike other interfaces, virtual interfaces do not provide DHCP services, and they do not verify that the gateway is available.

9.7.1 Virtual Interfaces Add/Edit

This screen lets you configure IP address assignment and interface parameters for virtual interfaces. To access this screen, click the **Create Virtual Interface** icon in the Ethernet, VLAN, or bridge interface summary screen.

Figure 81 Configuration > Network > Interface > Create Virtual Interface



Each field is described in the table below.

Table 64 Configuration > Network > Interface > Create Virtual Interface

LABEL	DESCRIPTION
Interface Properties	
Interface Name	This field is read-only. It displays the name of the virtual interface, which is automatically derived from the underlying Ethernet interface, VLAN interface, or bridge interface.
Description	Enter a description of this interface. It is not used elsewhere. You can use alphanumeric and `()+/:=?!*#@$_%-` characters, and it can be up to 60 characters long.
IP Address Assignment	
IP Address	Enter the IP address for this interface.
Subnet Mask	Enter the subnet mask of this interface in dot decimal notation. The subnet mask indicates what part of the IP address is the same for all computers in the network.
Gateway	Enter the IP address of the gateway. The UAG sends packets to the gateway when it does not know how to route the packet to its destination. The gateway should be on the same network as the interface.
Metric	Enter the priority of the gateway (if any) on this interface. The UAG decides which gateway to use based on this priority. The lower the number, the higher the priority. If two or more gateways have the same priority, the UAG uses the one that was configured first.
Interface Parameters	
Egress Bandwidth	Enter the maximum amount of traffic, in kilobits per second, the UAG can send through the interface to the network. Allowed values are 0 - 1048576.

Table 64 Configuration > Network > Interface > Create Virtual Interface (continued)

LABEL	DESCRIPTION
Ingress Bandwidth	This is reserved for future use. Enter the maximum amount of traffic, in kilobits per second, the UAG can receive from the network through the interface. Allowed values are 0 - 1048576.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

9.8 Interface Technical Reference

Here is more detailed information about interfaces on the UAG.

IP Address Assignment

Most interfaces have an IP address and a subnet mask. This information is used to create an entry in the routing table.

Figure 82 Example: Entry in the Routing Table Derived from Interfaces

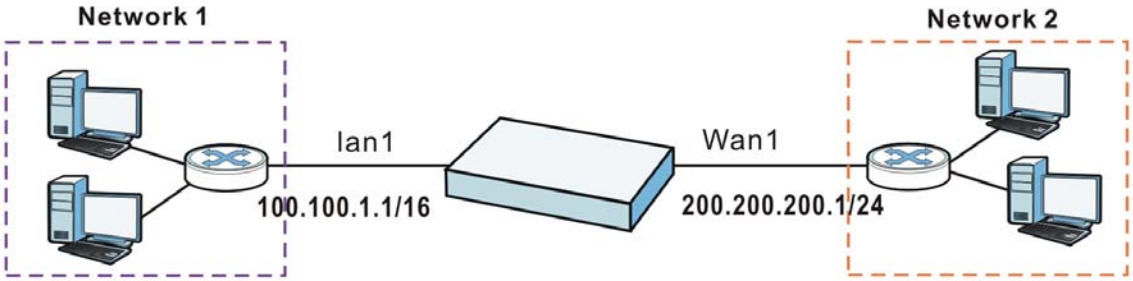


Table 65 Example: Routing Table Entries for Interfaces

IP ADDRESS(ES)	DESTINATION
100.100.1.1/16	lan1
200.200.200.1/24	wan1

For example, if the UAG gets a packet with a destination address of 100.100.25.25, it routes the packet to interface lan1. If the UAG gets a packet with a destination address of 200.200.200.200, it routes the packet to interface wan1.

In most interfaces, you can enter the IP address and subnet mask manually. In PPPoE/PPTP interfaces, however, the subnet mask is always 255.255.255.255 because it is a point-to-point interface. For these interfaces, you can only enter the IP address.

In many interfaces, you can also let the IP address and subnet mask be assigned by an external DHCP server on the network. In this case, the interface is a DHCP client. Virtual interfaces, however, cannot be DHCP clients. You have to assign the IP address and subnet mask manually.

In general, the IP address and subnet mask of each interface should not overlap, though it is possible for this to happen with DHCP clients.

In the example above, if the UAG gets a packet with a destination address of 5.5.5.5, it might not find any entries in the routing table. In this case, the packet is dropped. However, if there is a default router to which the UAG should send this packet, you can specify it as a gateway in one of the interfaces. For example, if there is a default router at 200.200.200.100, you can create a gateway at 200.200.200.100 on wan1. In this case, the UAG creates the following entry in the routing table.

Table 66 Example: Routing Table Entry for a Gateway

IP ADDRESS(ES)	DESTINATION
0.0.0.0/0	200.200.200.100

The gateway is an optional setting for each interface. If there is more than one gateway, the UAG uses the gateway with the lowest metric, or cost. If two or more gateways have the same metric, the UAG uses the one that was set up first (the first entry in the routing table). In PPPoE/PPTP interfaces, the other computer is the gateway for the interface by default. In this case, you should specify the metric.

If the interface gets its IP address and subnet mask from a DHCP server, the DHCP server also specifies the gateway, if any.

Interface Parameters

The UAG restricts the amount of traffic into and out of the UAG through each interface.

- Egress bandwidth sets the amount of traffic the UAG sends out through the interface to the network.
- Ingress bandwidth sets the amount of traffic the UAG allows in through the interface from the network.[1]

If you set the bandwidth restrictions very high, you effectively remove the restrictions.

The UAG also restricts the size of each data packet. The maximum number of bytes in each packet is called the maximum transmission unit (MTU). If a packet is larger than the MTU, the UAG divides it into smaller fragments. Each fragment is sent separately, and the original packet is re-assembled later. The smaller the MTU, the more fragments sent, and the more work required to re-assemble packets correctly. On the other hand, some communication channels, such as Ethernet over ATM, might not be able to handle large data packets.

DHCP Settings

Dynamic Host Configuration Protocol (DHCP, RFC 2131, RFC 2132) provides a way to automatically set up and maintain IP addresses, subnet masks, gateways, and some network information (such as the IP addresses of DNS servers) on computers in the network. This reduces the amount of manual configuration you have to do and usually uses available IP addresses more efficiently.

In DHCP, every network has at least one DHCP server. When a computer (a DHCP client) joins the network, it submits a DHCP request. The DHCP servers get the request; assign an IP address; and provide the IP address, subnet mask, gateway, and available network information to the DHCP client. When the DHCP client leaves the network, the DHCP servers can assign its IP address to another DHCP client.

1. At the time of writing, the UAG does not support ingress bandwidth management.

In the UAG, some interfaces can provide DHCP services to the network. In this case, the interface can be a DHCP relay or a DHCP server.

As a DHCP relay, the interface routes DHCP requests to DHCP servers on different networks. You can specify more than one DHCP server. If you do, the interface routes DHCP requests to all of them. It is possible for an interface to be a DHCP relay and a DHCP client simultaneously.

As a DHCP server, the interface provides the following information to DHCP clients.

- IP address - If the DHCP client's MAC address is in the UAG's static DHCP table, the interface assigns the corresponding IP address. If not, the interface assigns IP addresses from a pool, defined by the starting address of the pool and the pool size.

Table 67 Example: Assigning IP Addresses from a Pool

START IP ADDRESS	POOL SIZE	RANGE OF ASSIGNED IP ADDRESS
50.50.50.33	5	50.50.50.33 - 50.50.50.37
75.75.75.1	200	75.75.75.1 - 75.75.75.200
99.99.1.1	1023	99.99.1.1 - 99.99.4.255
120.120.120.100	100	120.120.120.100 - 120.120.120.199

  The UAG cannot assign the first address (network address) or the last address (broadcast address) in the subnet defined by the interface's IP address and subnet mask. For example, in the first entry, if the subnet mask is 255.255.255.0, the UAG cannot assign 50.50.50.0 or 50.50.50.255. If the subnet mask is 255.255.0.0, the UAG cannot assign 50.50.0.0 or 50.50.255.255. Otherwise, it can assign every IP address in the range, except the interface's IP address.

  If you do not specify the starting address or the pool size, the interface the maximum range of IP addresses allowed by the interface's IP address and subnet mask. For example, if the interface's IP address is 9.9.9.1 and subnet mask is 255.255.255.0, the starting IP address in the pool is 9.9.9.2, and the pool size is 253.

- Subnet mask - The interface provides the same subnet mask you specify for the interface. See IP Address Assignment on page 133.
- Gateway - The interface provides the same gateway you specify for the interface. See IP Address Assignment on page 133.
- DNS servers - The interface provides IP addresses for up to three DNS servers that provide DNS services for DHCP clients. You can specify each IP address manually (for example, a company's own DNS server), or you can refer to DNS servers that other interfaces received from DHCP servers (for example, a DNS server at an ISP). These other interfaces have to be DHCP clients.

It is not possible for an interface to be the DHCP server and a DHCP client simultaneously.

WINS

WINS (Windows Internet Naming Service) is a Windows implementation of NetBIOS Name Server (NBNS) on Windows. It keeps track of NetBIOS computer names. It stores a mapping table of your network's computer names and IP addresses. The table is dynamically updated for IP addresses assigned by DHCP. This helps reduce broadcast traffic since computers can query the server instead of broadcasting a request for a computer name's IP address. In this way WINS is similar to DNS, although WINS does not use a hierarchy (unlike DNS). A network can have more than one WINS server. Samba can also serve as a WINS server.

PPPoE/PPTP Overview

Point-to-Point Protocol over Ethernet (PPPoE, RFC 2516) and Point-to-Point Tunneling Protocol (PPTP, RFC 2637) are usually used to connect two computers over phone lines or broadband connections. PPPoE is often used with cable modems and DSL connections. It provides the following advantages:

- The access and authentication method works with existing systems, including RADIUS.
- You can access one of several network services. This makes it easier for the service provider to offer the service
- PPPoE does not usually require any special configuration of the modem.

PPTP is used to set up virtual private networks (VPN) in unsecure TCP/IP environments. It sets up two sessions.

1 The first one runs on TCP port 1723. It is used to start and manage the second one.

2 The second one uses Generic Routing Encapsulation (GRE, RFC 2890) to transfer information between the computers.

PPTP is convenient and easy-to-use, but you have to make sure that firewalls support both PPTP sessions.

10

Trunks

10.1 Overview

Use trunks for WAN traffic load balancing to increase overall network throughput and reliability. Load balancing divides traffic loads between multiple interfaces. This allows you to improve quality of service and maximize bandwidth utilization for multiple ISP links.

Maybe you have two Internet connections with different bandwidths. You could set up a trunk that uses spillover or weighted round robin load balancing so time-sensitive traffic (like video) usually goes through the higher-bandwidth interface. For other traffic, you might want to use least load first load balancing to even out the distribution of the traffic load.

Suppose ISP A has better connections to Europe while ISP B has better connections to Australia. You could use policy routes and trunks to have traffic for your European branch office primarily use ISP A and traffic for your Australian branch office primarily use ISP B.

Or maybe one of the UAG's interfaces is connected to an ISP that is also your Voice over IP (VoIP) service provider. You can use policy routing to send the VoIP traffic through a trunk with the interface connected to the VoIP service provider set to active and another interface (connected to another ISP) set to passive. This way VoIP traffic goes through the interface connected to the VoIP service provider whenever the interface's connection is up.

10.1.1 What You Can Do in this Chapter

- Use the **Trunk** summary screen (Section 10.2 on page 140) to configure link sticking and view the list of configured trunks and which load balancing algorithm each trunk uses.
- Use the **Add Trunk** screen (Section 10.2.1 on page 141) to configure the member interfaces for a trunk and the load balancing algorithm the trunk uses.
- Use the **Add System Default** screen (Section 10.2.2 on page 143) to configure the load balancing algorithm for the system default trunk.

10.1.2 What You Need to Know

- Add WAN interfaces to trunks to have multiple connections share the traffic load.
- If one WAN interface's connection goes down, the UAG sends traffic through another member of the trunk.
- For example, you connect one WAN interface to one ISP and connect a second WAN interface to a second ISP. The UAG balances the WAN traffic load between the connections. If one interface's connection goes down, the UAG can automatically send its traffic through another interface.

You can also use trunks with policy routing to send specific traffic types through the best WAN interface for that type of traffic.

- If that interface's connection goes down, the UAG can still send its traffic through another interface.
- You can define multiple trunks for the same physical interfaces.

Load Balancing Algorithms

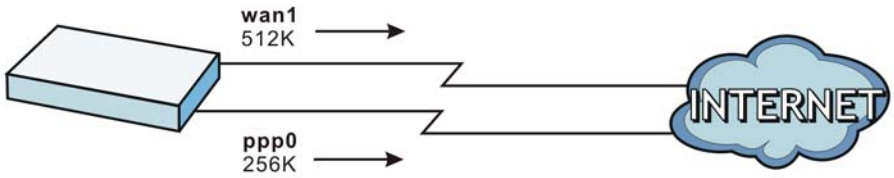
The following sections describe the load balancing algorithms the UAG can use to decide which interface the traffic (from the LAN) should use for a session[2]. The available bandwidth you configure on the UAG refers to the actual bandwidth provided by the ISP and the measured bandwidth refers to the bandwidth an interface is currently using.

Least Load First

The least load first algorithm uses the current (or recent) outbound bandwidth utilization of each trunk member interface as the load balancing index(es) when making decisions about to which interface a new session is to be distributed. The outbound bandwidth utilization is defined as the measured outbound throughput over the available outbound bandwidth.

Here the UAG has two WAN interfaces connected to the Internet. The configured available outbound bandwidths for wan1 and ppp0 are 512K and 256K respectively.

Figure 83 Least Load First Example



The outbound bandwidth utilization is used as the load balancing index. In this example, the measured (current) outbound throughput of wan1 is 412K and ppp0 is 198K. The UAG calculates the load balancing index as shown in the table below.

Since ppp0 has a smaller load balancing index (meaning that it is less utilized than wan1), the UAG will send the subsequent new session traffic through ppp0.

Table 68 Least Load First Example

INTERFACE	OUTBOUND		LOAD BALANCING INDEX (M/A)
	AVAILABLE (A)	MEASURED (M)	
wan1	512 K	412 K	0.8
ppp0	256 K	198 K	0.77

Weighted Round Robin

Round Robin scheduling services queues on a rotating basis and is activated only when an interface has more traffic than it can handle. A queue is given an amount of bandwidth irrespective of the incoming traffic on that interface. This queue then moves to the back of the list. The next queue is

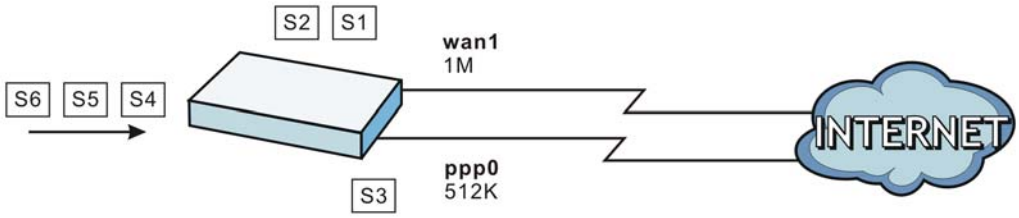
2. In the load balancing section, a session may refer to normal connection-oriented, UDP or SNMP2 traffic.

given an equal amount of bandwidth, and then moves to the end of the list; and so on, depending on the number of queues being used. This works in a looping fashion until a queue is empty.

The Weighted Round Robin (WRR) algorithm is best suited for situations when the bandwidths set for the two WAN interfaces are different. Similar to the Round Robin (RR) algorithm, the Weighted Round Robin (WRR) algorithm sets the UAG to send traffic through each WAN interface in turn. In addition, the WAN interfaces are assigned weights. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight.

For example, in the figure below, the configured available bandwidth of wan1 is 1M and ppp0 is 512K. You can set the UAG to distribute the network traffic between the two interfaces by setting the weight of wan1 and ppp0 to 2 and 1 respectively. The UAG assigns the traffic of two sessions to wan1 and one session's traffic to ppp0 in each round of 3 new sessions.

Figure 84 Weighted Round Robin Algorithm Example



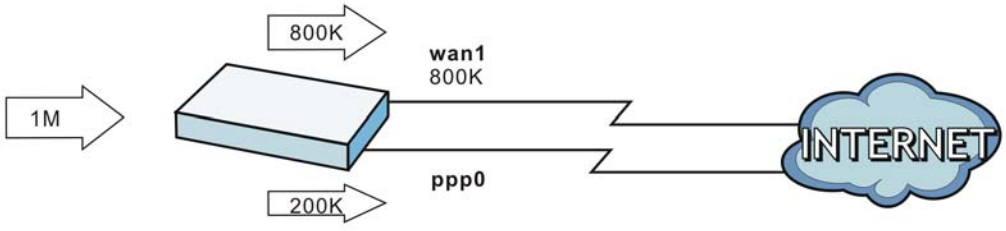
Spillover

The spillover load balancing algorithm sends network traffic to the first interface in the trunk member list until the interface's maximum allowable load is reached, then sends the excess network traffic of new sessions to the next interface in the trunk member list. This continues as long as there are more member interfaces and traffic to be sent through them.

Suppose the first trunk member interface uses an unlimited access Internet connection and the second is billed by usage. Spillover load balancing only uses the second interface when the traffic load exceeds the threshold on the first interface. This fully utilizes the bandwidth of the first interface to reduce Internet usage fees and avoid overloading the interface.

In this example figure, the upper threshold of the first interface is set to 800K. The UAG sends network traffic of new sessions that exceed this limit to the secondary WAN interface.

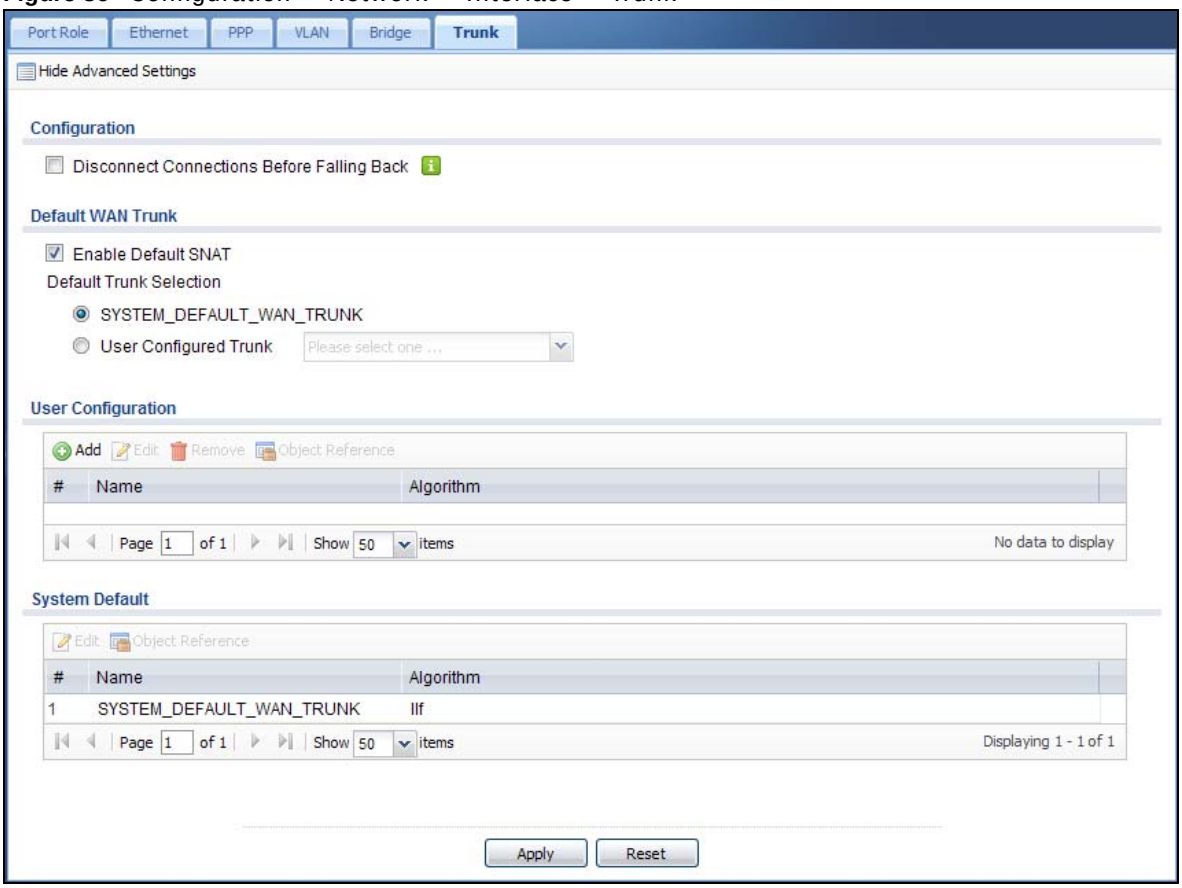
Figure 85 Spillover Algorithm Example



10.2 The Trunk Summary Screen

Click **Configuration > Network > Interface > Trunk** to open the **Trunk** screen. This screen lists the configured trunks and the load balancing algorithm that each is configured to use.

Figure 86 Configuration > Network > Interface > Trunk



The following table describes the items in this screen.

Table 69 Configuration > Network > Interface > Trunk

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Disconnect Connections Before Falling Back	Select this to terminate existing connections on an interface which is set to passive mode when any interface set to active mode in the same trunk comes back up.
Enable Default SNAT	Select this to have the UAG use the IP address of the outgoing interface as the source IP address of the packets it sends out through its WAN trunks. The UAG automatically adds SNAT settings for traffic it routes from internal interfaces to external interfaces.
Default Trunk Selection	Select whether the UAG is to use the default system WAN trunk or one of the user configured WAN trunks as the default trunk for routing traffic from internal interfaces to external interfaces.

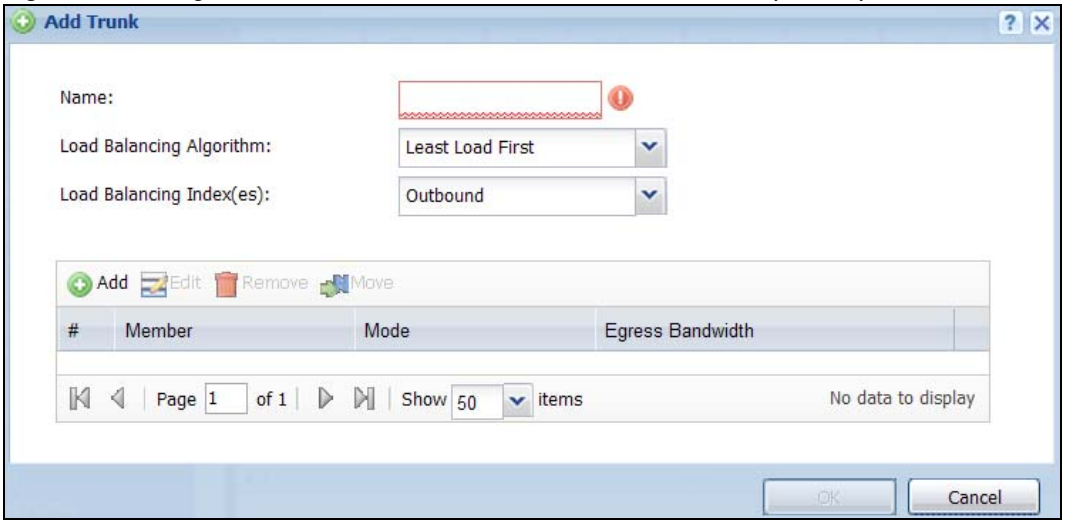
Table 69 Configuration > Network > Interface > Trunk (continued)

LABEL	DESCRIPTION
User Configuration / System Default	The UAG automatically adds all external interfaces into the pre-configured system default **SYSTEM_DEFAULT_WAN_TRUNK**. You cannot delete it. You can create your own **User Configuration** trunks and customize the algorithm, member interfaces and the active/passive mode.
Add	Click this to create a new user-configured trunk.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove a user-configured trunk, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Name	This field displays the label that you specified to identify the trunk.
Algorithm	This field displays the load balancing method the trunk is set to use.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

10.2.1 Configuring a User-Defined Trunk

Click **Configuration > Network > Interface > Trunk**, in the **User Configuration** table click the **Add** (or **Edit**) icon to open the **following** screen. Use this screen to create or edit a WAN trunk entry.

Figure 87 Configuration > Network > Interface > Trunk > Add (or Edit)



Each field is described in the table below.

Table 70 Configuration > Network > Interface > Trunk > Add (or Edit)

LABEL	DESCRIPTION
Name	This is read-only if you are editing an existing trunk. When adding a new trunk, enter a descriptive name for this trunk. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Load Balancing Algorithm	Select a load balancing method to use from the drop-down list box. Select **Weighted Round Robin** to balance the traffic load between interfaces based on their respective weights. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight. For example, if the weight ratio of wan1 and ppp0 interfaces is 2:1, the UAG chooses wan1 for 2 sessions' traffic and ppp0 for 1 session's traffic in each round of 3 new sessions. Select **Least Load First** to send new session traffic through the least utilized trunk member. Select **Spillover** to send network traffic through the first interface in the group member list until there is enough traffic that the second interface needs to be used (and so on).
Load Balancing Index(es)	This field is available if you selected to use the **Least Load First** or **Spillover** method. Select **Outbound**, **Inbound**, or **Outbound + Inbound** to set the traffic to which the UAG applies the load balancing method. Outbound means the traffic traveling from an internal interface (ex. LAN) to an external interface (ex. WAN). Inbound means the opposite.
	The table lists the trunk's member interfaces. You can add, edit, remove, or move entries for user configured trunks.
Add	Click this to add a member interface to the trunk. Select an interface and click **Add** to add a new member interface after the selected member interface.
Edit	Select an entry and click **Edit** to modify the entry's settings.
Remove	To remove a member interface, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Move	To move an interface to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
#	This column displays the priorities of the group's interfaces. The order of the interfaces in the list is important since they are used in the order they are listed.
Member	Click this table cell and select an interface to be a group member.
Mode	Click this table cell and select **Active** to have the UAG always attempt to use this connection. Select **Passive** to have the UAG only use this connection when all of the connections set to active are down. You can only set one of a group's interfaces to passive mode.
Weight	This field displays with the weighted round robin load balancing algorithm. Specify the weight (1~10) for the interface. The weights of the different member interfaces form a ratio. This ratio determines how much traffic the UAG assigns to each member interface. The higher an interface's weight is (relative to the weights of the interfaces), the more sessions that interface should handle.
Ingress Bandwidth	This is reserved for future use. This field displays with the least load first load balancing algorithm. It displays the maximum number of kilobits of data the UAG is to allow to come in through the interface per second. Note: You can configure the bandwidth of an interface in the corresponding interface edit screen.

Table 70 Configuration > Network > Interface > Trunk > Add (or Edit) (continued)

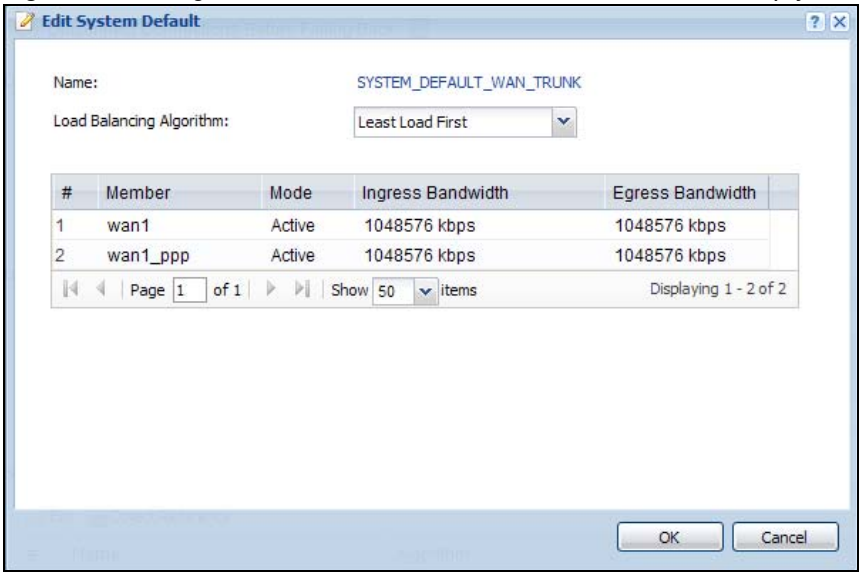
LABEL	DESCRIPTION
Egress Bandwidth	This field displays with the least load first or spillover load balancing algorithm. It displays the maximum number of kilobits of data the UAG is to send out through the interface per second. Note: You can configure the bandwidth of an interface in the corresponding interface edit screen.
Total Bandwidth	This field displays with the spillover load balancing algorithm. It displays the maximum number of kilobits of data the UAG is to send out and allow to come in through the interface per second. You can configure the bandwidth of an interface in the corresponding interface edit screen.
Spillover	This field displays with the spillover load balancing algorithm. Specify the maximum bandwidth of traffic in kilobits per second (1~1048576) to send out through the interface before using another interface. When this spillover bandwidth limit is exceeded, the UAG sends new session traffic through the next interface. The traffic of existing sessions still goes through the interface on which they started. The UAG uses the group member interfaces in the order that they are listed.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

10.2.2 Configuring the System Default Trunk

In the **Configuration > Network > Interface > Trunk** screen and the **System Default** section, select the default trunk entry and click **Edit** to open the **following** screen. Use this screen to change the load balancing algorithm and view the bandwidth allocations for each member interface.

Note: The available bandwidth is allocated to each member interface equally and is not allowed to be changed for the default trunk.

Figure 88 Configuration > Network > Interface > Trunk > Edit (System Default)



Each field is described in the table below.

Table 71 Configuration > Network > Interface > Trunk > Edit (System Default)

LABEL	DESCRIPTION
Name	This field displays the name of the selected system default trunk.
Load Balancing Algorithm	Select the load balancing method to use for the trunk. Select **Weighted Round Robin** to balance the traffic load between interfaces based on their respective weights. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight. For example, if the weight ratio of wan1 and ppp0 interfaces is 2:1, the UAG chooses wan1 for 2 sessions' traffic and ppp0 for 1 session's traffic in each round of 3 new sessions. Select **Least Load First** to send new session traffic through the least utilized trunk member. Select **Spillover** to send network traffic through the first interface in the group member list until there is enough traffic that the second interface needs to be used (and so on).
	The table lists the trunk's member interfaces. This table is read-only.
#	This column displays the priorities of the group's interfaces. The order of the interfaces in the list is important since they are used in the order they are listed.
Member	This column displays the name of the member interfaces.
Mode	This field displays **Active** if the UAG always attempt to use this connection. This field displays **Passive** if the UAG only use this connection when all of the connections set to active are down. Only one of a group's interfaces can be set to passive mode.
Weight	This field displays with the weighted round robin load balancing algorithm. Specify the weight (1~10) for the interface. The weights of the different member interfaces form a ratio. s
Ingress Bandwidth	This is reserved for future use. This field displays with the least load first load balancing algorithm. It displays the maximum number of kilobits of data the UAG is to allow to come in through the interface per second.
Egress Bandwidth	This field displays with the least load first or spillover load balancing algorithm. It displays the maximum number of kilobits of data the UAG is to send out through the interface per second.
Spillover	This field displays with the spillover load balancing algorithm. Specify the maximum bandwidth of traffic in kilobits per second (1~1048576) to send out through the interface before using another interface. When this spillover bandwidth limit is exceeded, the UAG sends new session traffic through the next interface. The traffic of existing sessions still goes through the interface on which they started. The UAG uses the group member interfaces in the order that they are listed.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

11

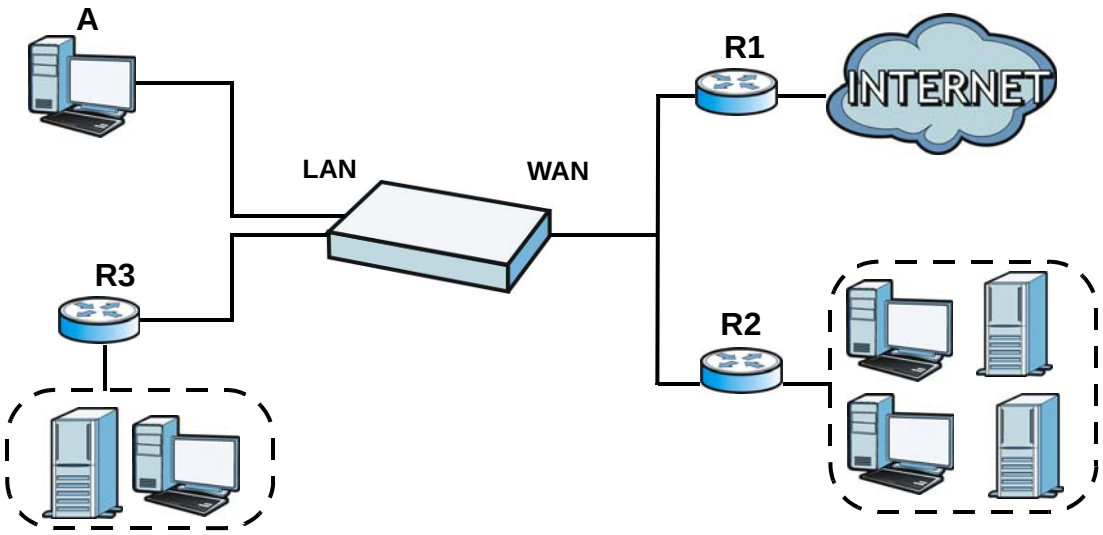
Policy and Static Routes

11.1 Policy and Static Routes Overview

Use policy routes and static routes to override the UAG's default routing behavior in order to send packets through the appropriate interface.

For example, the next figure shows a computer (**A**) connected to the UAG's LAN interface. The UAG routes most traffic from **A** to the Internet through the UAG's default gateway (**R1**). You create one policy route to connect to services offered by your ISP behind router **R2**. You create another policy route to communicate with a separate network behind another router (**R3**) connected to the LAN.

Figure 89 Example of Policy Routing Topology



11.1.1 What You Can Do in this Chapter

- Use the **Policy Route** screens (see Section 11.2 on page 147) to list and configure policy routes.
- Use the **Static Route** screens (see Section 11.3 on page 152) to list and configure static routes.

11.1.2 What You Need to Know

Policy Routing

Traditionally, routing is based on the destination address only and the UAG takes the shortest path to forward a packet. IP Policy Routing (IPPR) provides a mechanism to override the default routing behavior and alter the packet forwarding based on the policy defined by the network administrator.

Policy-based routing is applied to incoming packets on a per interface basis, prior to the normal routing.

How You Can Use Policy Routing

- Source-Based Routing – Network administrators can use policy-based routing to direct traffic from different users through different connections.
- Cost Savings – IPPR allows organizations to distribute interactive traffic on high-bandwidth, high-cost paths while using low-cost paths for batch traffic.
- Load Sharing – Network administrators can use IPPR to distribute traffic among multiple paths.
- NAT - The UAG performs NAT by default for traffic going to or from the **WAN** interfaces. A routing policy's SNAT allows network administrators to have traffic received on a specified interface use a specified IP address as the source IP address.

Note: The UAG automatically uses SNAT for traffic it routes from internal interfaces to external interfaces. For example LAN to WAN traffic.

Static Routes

The UAG usually uses the default gateway to route outbound traffic from computers on the LAN to the Internet. To have the UAG send data to devices not reachable through the default gateway, use static routes.

Policy Routes Versus Static Routes

- Policy routes are more flexible than static routes. You can select more criteria for the traffic to match and can also use schedules, and NAT.
- Policy routes are only used within the UAG itself.
- Policy routes take priority over static routes. If you need to use a routing policy on the UAG and propagate it to other routers, you could configure a policy route and an equivalent static route.

DiffServ

QoS is used to prioritize source-to-destination traffic flows. All packets in the same flow are given the same priority. CoS (class of service) is a way of managing traffic in a network by grouping similar types of traffic together and treating each type as a class. You can use CoS to give different priorities to different packet types.

DiffServ (Differentiated Services) is a class of service (CoS) model that marks packets so that they receive specific per-hop treatment at DiffServ-compliant network devices along the route based on the application types and traffic flow. Packets are marked with DiffServ Code Points (DSCPs) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.

DSCP Marking and Per-Hop Behavior

DiffServ defines a new DS (Differentiated Services) field to replace the Type of Service (TOS) field in the IP header. The DS field contains a 2-bit unused field and a 6-bit DSCP field which can define up to 64 service levels. The following figure illustrates the DS field.

DSCP (6 bits)	Unused (2 bits)

DSCP is backward compatible with the three precedence bits in the ToS octet so that non-DiffServ compliant, ToS-enabled network device will not conflict with the DSCP mapping.

The DSCP value determines the forwarding behavior, the PHB (Per-Hop Behavior), that each packet gets across the DiffServ network. Based on the marking rule, different kinds of traffic can be marked for different kinds of forwarding. Resources can then be allocated according to the DSCP values and the configured policies.

Finding Out More

- See Section 11.4 on page 154 for more background information on policy routing.

11.2 Policy Route Screen

Click **Configuration > Network > Routing** to open the **Policy Route** screen. Use this screen to see the configured policy routes.

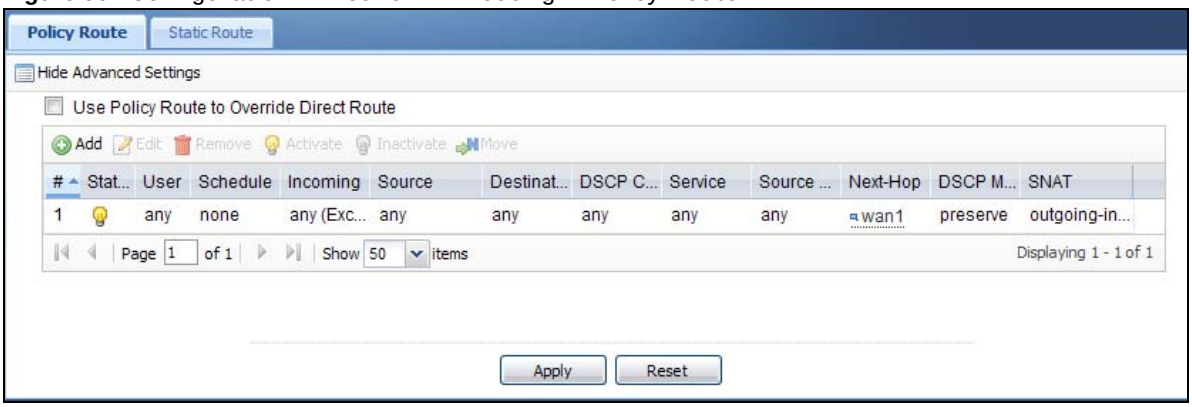
A policy route defines the matching criteria and the action to take when a packet meets the criteria. The action is taken only when all the criteria are met. The criteria can include the user name, source address and incoming interface, destination address, schedule, IP protocol (ICMP, UDP, TCP, etc.) and port.

The actions that can be taken include:

- Routing the packet to a different gateway, outgoing interface, or trunk.

IPPR follows the existing packet filtering facility of RAS in style and in implementation.

Figure 90 Configuration > Network > Routing > Policy Route



The following table describes the labels in this screen.

Table 72 Configuration > Network > Routing > Policy Route

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Use Policy Route to Override Direct Route	Select this to have the UAG forward packets that match a policy route according to the policy route instead of sending the packets directly to a connected network.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
#	This is the number of an individual policy route.
Status	This icon is lit when the entry is active, red when the next hop's connection is down, and dimmed when the entry is inactive.
User	This is the name of the user (group) object from which the packets are sent. **any** means all users.
Schedule	This is the name of the schedule object. **none** means the route is active at all times if enabled.
Incoming	This is the interface on which the packets are received.
Source	This is the name of the source IP address (group) object. **any** means all IP addresses.
Destination	This is the name of the destination IP address (group) object. **any** means all IP addresses.
DSCP Code	This is the DSCP value of incoming packets to which this policy route applies. **any** means all DSCP values or no DSCP marker. **default** means traffic with a DSCP value of 0. This is usually best effort traffic The "**af**" entries stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 154 for more details.
Service	This is the name of the service object. **any** means all services.
Source Port	This is the name of a service object. The UAG applies the policy route to the packets sent from the corresponding service port. **any** means all service ports.
Next-Hop	This is the next hop to which packets are directed. It helps forward packets to their destinations and can be a router, outgoing interface or trunk.

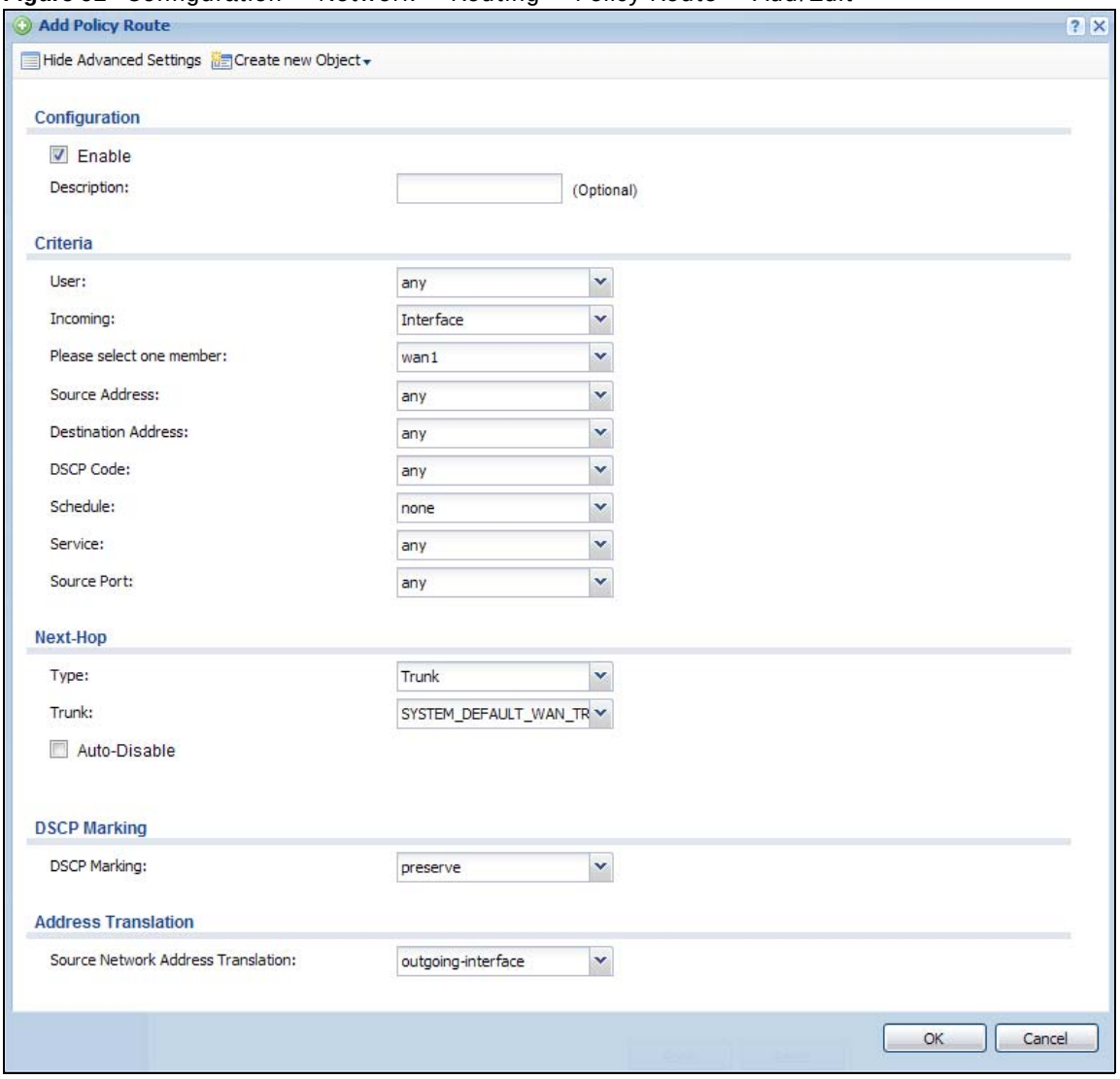
Table 72 Configuration > Network > Routing > Policy Route (continued)

LABEL	DESCRIPTION
DSCP Marking	This is how the UAG handles the DSCP value of the outgoing packets that match this route. If this field displays a DSCP value, the UAG applies that DSCP value to the route's outgoing packets. **preserve** means the UAG does not modify the DSCP value of the route's outgoing packets. **default** means the UAG sets the DSCP value of the route's outgoing packets to 0. The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 154 for more details.
SNAT	This is the source IP address that the route uses. It displays **none** if the UAG does not perform NAT for this route.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

11.2.1 Policy Route Edit Screen

Click **Configuration > Network > Routing** to open the **Policy Route** screen. Then click the **Add** or **Edit** icon in the **Configuration** section. The **Add Policy Route** or **Policy Route Edit** screen opens. Use this screen to configure or edit a policy route.

Figure 91 Configuration > Network > Routing > Policy Route > Add/Edit



The following table describes the labels in this screen.

Table 73 Configuration > Network > Routing > Policy Route > Add/Edit

LABEL	DESCRIPTION
Show / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Create new Object	Use this to configure any new settings objects that you need to use in this screen.
Configuration	
Enable	Select this to activate the policy.
Description	Enter a descriptive name of up to 31 printable ASCII characters for the policy.
Criteria	
User	Select a user name or user group from which the packets are sent.
Incoming	Select where the packets are coming from; any, an interface, or the UAG itself (**Device**). For an interface, you also need to select the individual interface.

Table 73 Configuration > Network > Routing > Policy Route > Add/Edit (continued)

LABEL	DESCRIPTION
Please select one member	This field displays only when you set **Incoming** to **Interface**. Select an interface from which the packets are sent.
Source Address	Select a source IP address object from which the packets are sent.
Destination Address	Select a destination IP address object to which the traffic is being sent.
DSCP Code	Select a DSCP code point value of incoming packets to which this policy route applies or select **User Define** to specify another DSCP code point. The lower the number the higher the priority with the exception of 0 which is usually given only best-effort treatment. **any** means all DSCP value or no DSCP marker. **default** means traffic with a DSCP value of 0. This is usually best effort traffic The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 154 for more details.
User-Defined DSCP Code	Use this field to specify a custom DSCP code point.
Schedule	Select a schedule to control when the policy route is active. **none** means the route is active at all times if enabled.
Service	Select a service or service group to identify the type of traffic to which this policy route applies.
Source Port	Select a service or service group to identify the source port of packets to which the policy route applies.
Next-Hop	
Type	Select **Auto** to have the UAG use the routing table to find a next-hop and forward the matched packets automatically. Select **Gateway** to route the matched packets to the next-hop router or switch you specified in the **Gateway** field. You have to set up the next-hop router or switch as a HOST address object first. Select **Trunk** to route the matched packets through the interfaces in the trunk group based on the load balancing algorithm. Select **Interface** to route the matched packets through the specified outgoing interface to a gateway (which is connected to the interface).
Gateway	This field displays when you select **Gateway** in the **Type** field. Select a HOST address object. The gateway is an immediate neighbor of your UAG that will forward the packet to the destination. The gateway must be a router or switch on the same segment as your UAG's interface(s).
Trunk	This field displays when you select **Trunk** in the **Type** field. Select a trunk group to have the UAG send the packets via the interfaces in the group.
Interface	This field displays when you select **Interface** in the **Type** field. Select an interface to have the UAG send traffic that matches the policy route through the specified interface.
Auto-Disable	This field displays when you select **Interface** or **Trunk** in the **Type** field. Select this to have the UAG automatically disable this policy route when the next hop's connection is down.
DSCP Marking	

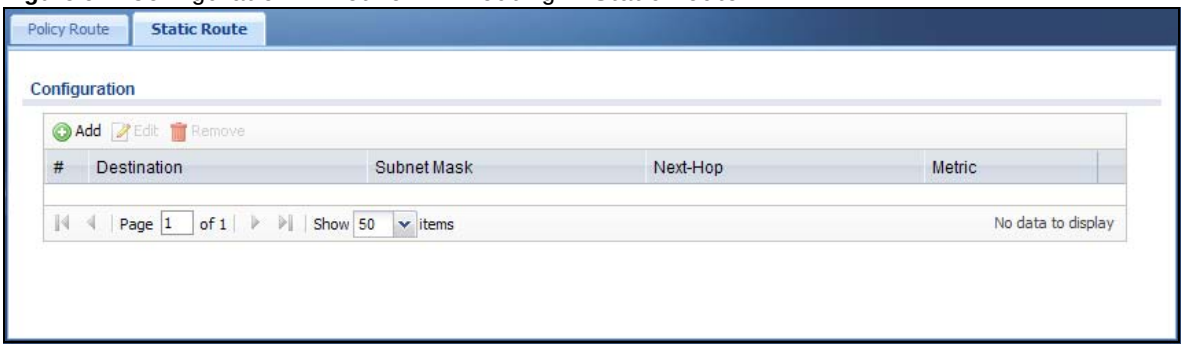
Table 73 Configuration > Network > Routing > Policy Route > Add/Edit (continued)

LABEL	DESCRIPTION
DSCP Marking	Set how the UAG handles the DSCP value of the outgoing packets that match this route. Select one of the pre-defined DSCP values to apply or select **User Define** to specify another DSCP value. The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Assured Forwarding (AF) PHB for DiffServ on page 154 for more details. Select **preserve** to have the UAG keep the packets' original DSCP value. Select **default** to have the UAG set the DSCP value of the packets to 0.
User-Defined DSCP Marking	Use this field to specify a custom DSCP value.
Address Translation	Use this section to configure NAT for the policy route.
Source Network Address Translation	Select **none** to not use NAT for the route. Select **outgoing-interface** to use the IP address of the outgoing interface as the source IP address of the packets that matches this route. To use SNAT for a virtual interface that is in the same WAN trunk as the physical interface to which the virtual interface is bound, the virtual interface and physical interface must be in different subnets. Otherwise, select a pre-defined address (group) to use as the source IP address(es) of the packets that match this route. Use **Create new Object** if you need to configure a new address (group) to use as the source IP address(es) of the packets that match this route.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

11.3 IP Static Route Screen

Click **Configuration > Network > Routing > Static Route** to open the **Static Route** screen. This screen displays the configured static routes. Configure static routes to be able to propagate the routing information to other routers.

Figure 92 Configuration > Network > Routing > Static Route



The following table describes the labels in this screen.

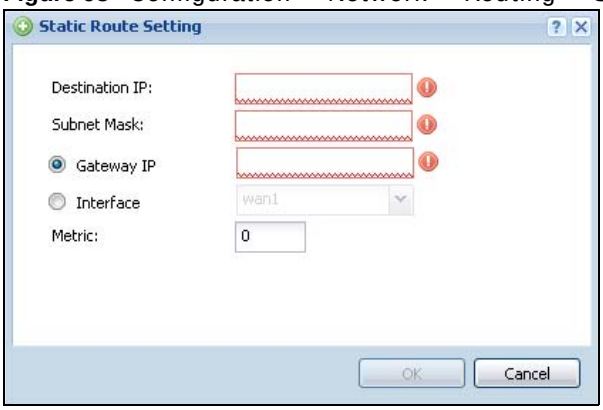
Table 74 Configuration > Network > Routing > Static Route

LABEL	DESCRIPTION
Add	Click this to create a new static route.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
#	This is the number of an individual static route.
Destination	This is the destination IP address.
Subnet Mask	This is the IP subnet mask.
Next-Hop	This is the IP address of the next-hop gateway or the interface through which the traffic is routed. The gateway is a router or switch on the same segment as your UAG's interface(s). The gateway helps forward packets to their destinations.
Metric	This is the route's priority among the UAG's routes. The smaller the number, the higher priority the route has.

11.3.1 Static Route Add/Edit Screen

Select a static route index number and click **Add** or **Edit**. The screen shown next appears. Use this screen to configure the required information for a static route.

Figure 93 Configuration > Network > Routing > Static Route > Add



The following table describes the labels in this screen.

Table 75 Configuration > Network > Routing > Static Route > Add

LABEL	DESCRIPTION
Destination IP	This parameter specifies the IP network address of the final destination. Routing is always based on network number. If you need to specify a route to a single host, enter the specific IP address here and use a subnet mask of 255.255.255.255 (for IPv4) in the **Subnet Mask** field to force the network number to be identical to the host ID.
Subnet Mask	Enter the IP subnet mask here.
Gateway IP	Select the radio button and enter the IP address of the next-hop gateway. The gateway is a router or switch on the same segment as your UAG's interface(s). The gateway helps forward packets to their destinations.
Interface	Select the radio button and a predefined interface through which the traffic is sent.

Table 75 Configuration > Network > Routing > Static Route > Add (continued)

LABEL	DESCRIPTION
Metric	Metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly connected networks. Enter a number that approximates the cost for this link. The number need not be precise, but it must be 0~127. In practice, 2 or 3 is usually a good number.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

11.4 Policy Routing Technical Reference

Here is more detailed information about some of the features you can configure in policy routing.

NAT and SNAT

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address in a packet in one network to a different IP address in another network. Use SNAT (Source NAT) to change the source IP address in one network to a different IP address in another network.

Assured Forwarding (AF) PHB for DiffServ

Assured Forwarding (AF) behavior is defined in RFC 2597. The AF behavior group defines four AF classes. Inside each class, packets are given a high, medium or low drop precedence. The drop precedence determines the probability that routers in the network will drop packets when congestion occurs. If congestion occurs between classes, the traffic in the higher class (smaller numbered class) is generally given priority. Combining the classes and drop precedence produces the following twelve DSCP encodings from AF11 through AF43. The decimal equivalent is listed in brackets.

Table 76 Assured Forwarding (AF) Behavior Group

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
Low Drop Precedence	AF11 (10)	AF21 (18)	AF31 (26)	AF41 (34)
Medium Drop Precedence	AF12 (12)	AF22 (20)	AF32 (28)	AF42 (36)
High Drop Precedence	AF13 (14)	AF23 (22)	AF33 (30)	AF43 (38)

12

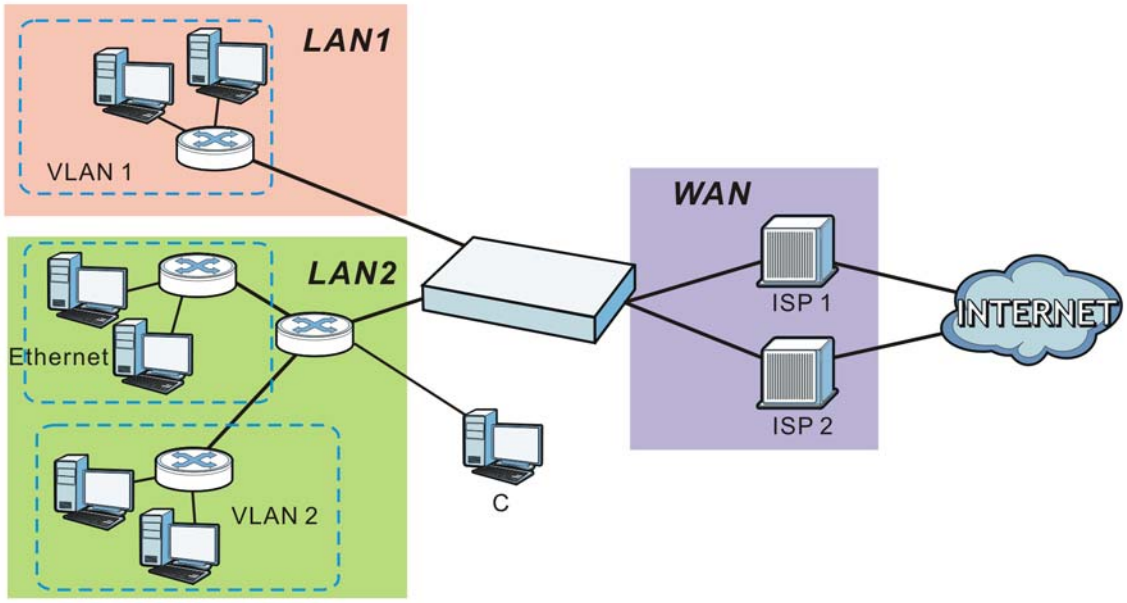
Zones

12.1 Zones Overview

Set up zones to configure network security and network policies in the UAG. A zone is a group of interfaces. The UAG uses zones instead of interfaces in many security and policy settings, such as firewall rules and remote management.

Zones cannot overlap. Each Ethernet interface, VLAN interface, bridge interface, and PPPoE/PPTP interface can be assigned to at most one zone. Virtual interfaces are automatically assigned to the same zone as the interface on which they run.

Figure 94 Example: Zones



12.1.1 What You Can Do in this Chapter

Use the **Zone** screens (see Section 12.2 on page 156) to manage the UAG's zones.

12.1.2 What You Need to Know

Effects of Zones on Different Types of Traffic

Zones effectively divide traffic into three types--intra-zone traffic, inter-zone traffic, and extra-zone traffic--which are affected differently by zone-based security and policy settings.

Intra-zone Traffic

- Intra-zone traffic is traffic between interfaces in the same zone. For example, in Figure 94 on page 155, traffic between **VLAN1** and the Ethernet is intra-zone traffic.
- You can also set up firewall rules to control intra-zone traffic (for example, LAN1-to-LAN1), but many other types of zone-based security and policy settings do not affect intra-zone traffic.

Inter-zone Traffic

Inter-zone traffic is traffic between interfaces in different zones. For example, in Figure 94 on page 155, traffic between **VLAN1** and the Internet is inter-zone traffic. This is the normal case when zone-based security and policy settings apply.

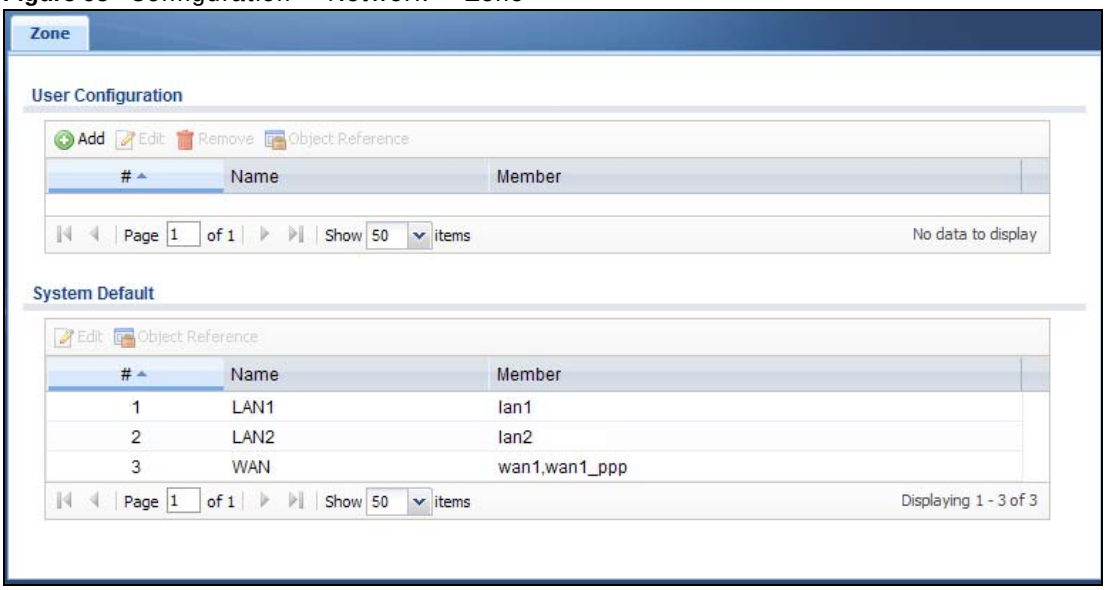
Extra-zone Traffic

- Extra-zone traffic is traffic to or from any interface that is not assigned to a zone. For example, in Figure 94 on page 155, traffic to or from computer **C** is extra-zone traffic.
- Some zone-based security and policy settings may apply to extra-zone traffic, especially if you can set the zone attribute in them to **Any** or **All**. See the specific feature for more information.

12.2 The Zone Screen

The **Zone** screen provides a summary of all zones. In addition, this screen allows you to add, edit, and remove zones. To access this screen, click **Configuration > Network > Zone**.

Figure 95 Configuration > Network > Zone



The following table describes the labels in this screen.

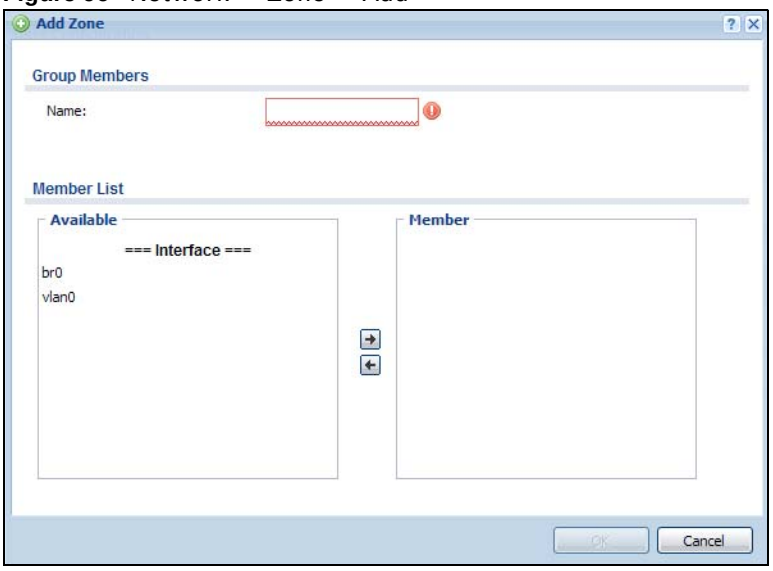
Table 77 Configuration > Network > Zone

LABEL	DESCRIPTION
User Configuration / System Default	The UAG comes with pre-configured **System Default** zones that you cannot delete. You can create your own **User Configuration** zones
Add	Click this to create a new, user-configured zone.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove a user-configured trunk, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with any interface.
Name	This field displays the name of the zone.
Member	This field displays the names of the interfaces that belong to each zone.

12.2.1 Zone Edit

The **Zone Edit** screen allows you to add or edit a zone. To access this screen, go to the **Zone** screen (see Section 12.2 on page 156), and click the **Add** icon or an **Edit** icon.

Figure 96 Network > Zone > Add



The following table describes the labels in this screen.

Table 78 Network > Zone > Add/Edit

LABEL	DESCRIPTION
Name	For a system default zone, the name is read only. For a user-configured zone, type the name used to refer to the zone. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Member List	**Available** lists the interfaces that do not belong to any zone. Select the interfaces that you want to add to the zone you are editing, and click the right arrow button to add them. **Member** lists the interfaces that belong to the zone. Select any interfaces that you want to remove from the zone, and click the left arrow button to remove them.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

13

DDNS

13.1 DDNS Overview

Dynamic DNS (DDNS) services let you use a domain name with a dynamic IP address.

13.1.1 What You Can Do in this Chapter

- Use the **DDNS** screen (see Section 13.2 on page 160) to view a list of the configured DDNS domain names and their details.
- Use the **DDNS Add/Edit** screen (see Section 13.2.1 on page 161) to add a domain name to the UAG or to edit the configuration of an existing domain name.

13.1.2 What You Need to Know

DNS maps a domain name to a corresponding IP address and vice versa. Similarly, dynamic DNS maps a domain name to a dynamic IP address. As a result, anyone can use the domain name to contact you (in NetMeeting, CU-SeeMe, etc.) or to access your FTP server or Web site, regardless of the current IP address.

Note: You must have a public WAN IP address to use Dynamic DNS.

You must set up a dynamic DNS account with a supported DNS service provider before you can use Dynamic DNS services with the UAG. When registration is complete, the DNS service provider gives you a password or key. At the time of writing, the UAG supports the following DNS service providers. See the listed websites for details about the DNS services offered by each.

Table 79 DDNS Service Providers

PROVIDER	SERVICE TYPES SUPPORTED	WEBSITE
DynDNS	Dynamic DNS, Static DNS, and Custom DNS	www.dyndns.com
Dynu	Basic, Premium	www.dynu.com
No-IP	No-IP	www.no-ip.com
Peanut Hull	Peanut Hull	www.oray.cn
3322	3322 Dynamic DNS, 3322 Static DNS	www.3322.org

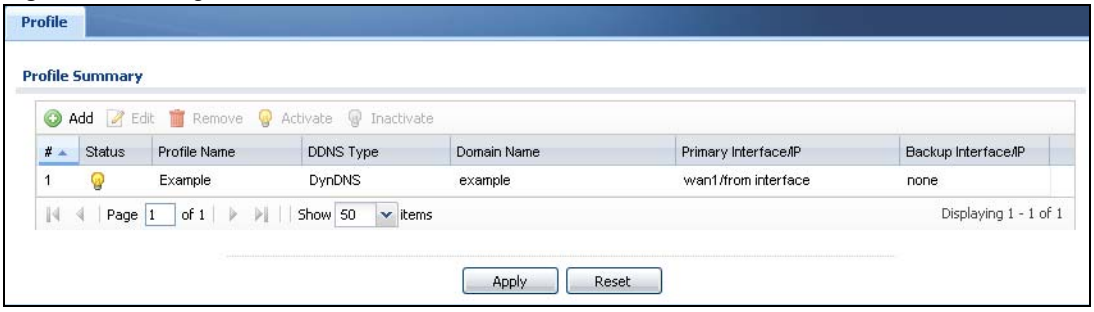
Note: Record your DDNS account's user name, password, and domain name to use to configure the UAG.

After, you configure the UAG, it automatically sends updated IP addresses to the DDNS service provider, which helps redirect traffic accordingly.

13.2 The DDNS Screen

The **DDNS** screen provides a summary of all DDNS domain names and their configuration. In addition, this screen allows you to add new domain names, edit the configuration for existing domain names, and delete domain names. Click **Configuration > Network > DDNS** to open the following screen.

Figure 97 Configuration > Network > DDNS



The following table describes the labels in this screen.

Table 80 Configuration > Network > DDNS

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This is the number of an individual DDNS profile.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Profile Name	This field displays the descriptive profile name for this entry.
DDNS Type	This field displays which DDNS service you are using.
Domain Name	This field displays each domain name the UAG can route.
Primary Interface/IP	This field displays the interface to use for updating the IP address mapped to the domain name followed by how the UAG determines the IP address for the domain name. **from interface** - The IP address comes from the specified interface. **auto detected** -The DDNS server checks the source IP address of the packets from the UAG for the IP address to use for the domain name. **custom** - The IP address is static.
Backup Interface/IP	This field displays the alternate interface to use for updating the IP address mapped to the domain name followed by how the UAG determines the IP address for the domain name. The UAG uses the backup interface and IP address when the primary interface is disabled, its link is down or its connectivity check fails. **from interface** - The IP address comes from the specified interface. **auto detected** -The DDNS server checks the source IP address of the packets from the UAG for the IP address to use for the domain name. **custom** - The IP address is static.

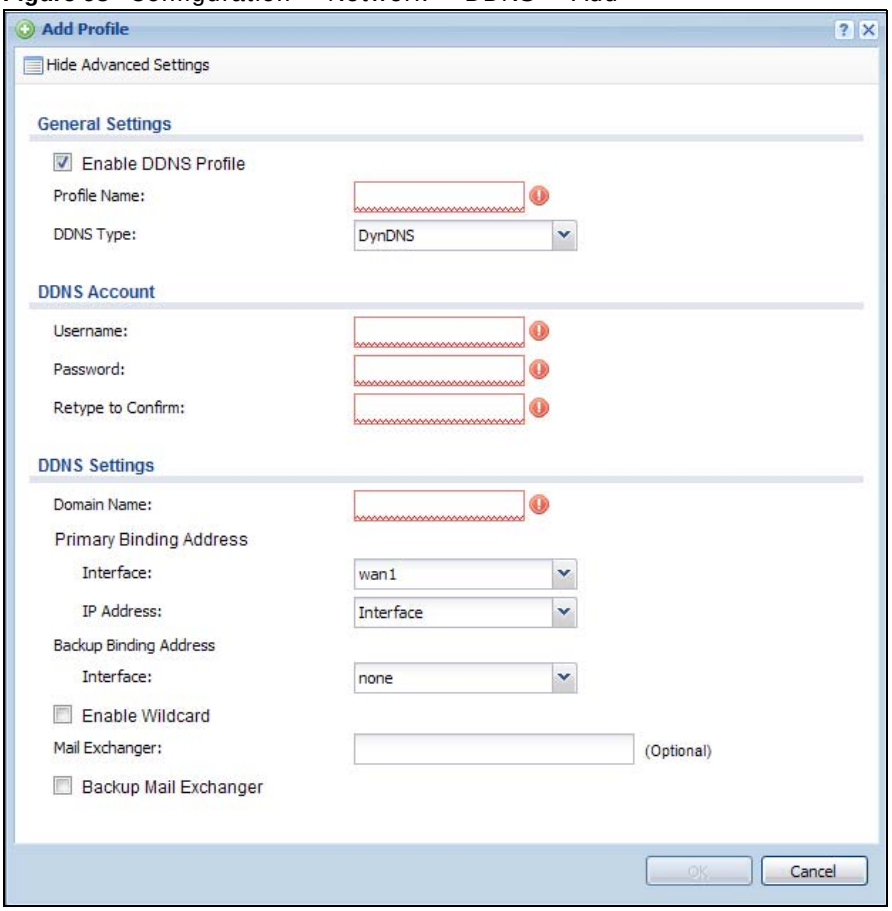
Table 80 Configuration > Network > DDNS (continued)

LABEL	DESCRIPTION
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

13.2.1 The Dynamic DNS Add/Edit Screen

The **DDNS Add / Edit** screen allows you to add a domain name to the UAG or to edit the configuration of an existing domain name. Click **Configuration > Network > DDNS** and then an **Add** or **Edit** icon to open this screen.

Figure 98 Configuration > Network > DDNS > Add



The following table describes the labels in this screen.

Table 81 Configuration > Network > DDNS > Add

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Enable DDNS Profile	Select this check box to use this DDNS entry.

Table 81 Configuration > Network > DDNS > Add (continued)

LABEL	DESCRIPTION
Profile Name	When you are adding a DDNS entry, type a descriptive name for this DDNS entry in the UAG. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. This field is read-only when you are editing an entry.
DDNS Type	Select the type of DDNS service you are using.
DDNS Account	
Username	Type the user name used when you registered your domain name. You can use up to 31 alphanumeric characters and the underscore. Spaces are not allowed. For a Dynu DDNS entry, this user name is the one you use for logging into the service, not the name recorded in your personal information in the Dynu website.
Password	Type the password provided by the DDNS provider. You can use up to 64 alphanumeric characters and the underscore. Spaces are not allowed.
Retype to Confirm	Retype your new password for confirmation.
DDNS Settings	
Domain name	Type the domain name you registered. You can use up to 255 characters.
Primary Binding Address	Use these fields to set how the UAG determines the IP address that is mapped to your domain name in the DDNS server. The UAG uses the **Backup Binding Address** if the interface specified by these settings is not available.
Interface	Select the interface to use for updating the IP address mapped to the domain name. Select **any** to let the domain name be used with any interface.
IP Address	The options available in this field vary by DDNS provider. **Interface** -The UAG uses the IP address of the specified interface. This option appears when you select a specific interface in the **Primary Binding Address Interface** field. **Auto** - If the interface has a dynamic IP address, the DDNS server checks the source IP address of the packets from the UAG for the IP address to use for the domain name. You may want to use this if there are one or more NAT routers between the UAG and the DDNS server. Note: The UAG may not determine the proper IP address if there is an HTTP proxy server between the UAG and the DDNS server. **Custom** - If you have a static IP address, you can select this to use it for the domain name. The UAG still sends the static IP address to the DDNS server.
Custom IP	This field is only available when the **IP Address** is **Custom**. Type the IP address to use for the domain name.
Backup Binding Address	Use these fields to set an alternate interface to map the domain name to when the interface specified by the **Primary Binding Interface** settings is not available.
Interface	Select the interface to use for updating the IP address mapped to the domain name. Select **any** to let the domain name be used with any interface. Select **None** to not use a backup address.

Table 81 Configuration > Network > DDNS > Add (continued)

LABEL	DESCRIPTION
IP Address	The options available in this field vary by DDNS provider. **Interface** -The UAG uses the IP address of the specified interface. This option appears when you select a specific interface in the **Backup Binding Address Interface** field. **Auto** -The DDNS server checks the source IP address of the packets from the UAG for the IP address to use for the domain name. You may want to use this if there are one or more NAT routers between the UAG and the DDNS server. Note: The UAG may not determine the proper IP address if there is an HTTP proxy server between the UAG and the DDNS server. **Custom** - If you have a static IP address, you can select this to use it for the domain name. The UAG still sends the static IP address to the DDNS server.
Custom IP	This field is only available when the **IP Address** is **Custom**. Type the IP address to use for the domain name.
Enable Wildcard	This option is only available with a DynDNS account. Enable the wildcard feature to alias subdomains to be aliased to the same IP address as your (dynamic) domain name. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.
Mail Exchanger	This option is only available with a DynDNS account. DynDNS can route e-mail for your domain name to a mail server (called a mail exchanger). For example, DynDNS routes e-mail for john-doe@yourhost.dyndns.org to the host record specified as the mail exchanger. If you are using this service, type the host record of your mail server here. Otherwise leave the field blank. See www.dyndns.org for more information about mail exchangers.
Backup Mail Exchanger	This option is only available with a DynDNS account. Select this check box if you are using DynDNS's backup service for e-mail. With this service, DynDNS holds onto your e-mail if your mail server is not available. Once your mail server is available again, the DynDNS server delivers the mail to you. See www.dyndns.org for more information about this service.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

14

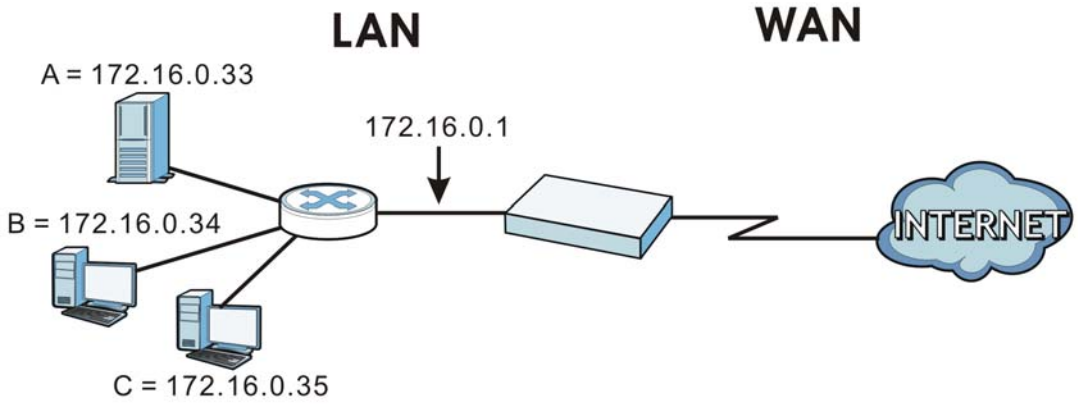
NAT

14.1 NAT Overview

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network. Use Network Address Translation (NAT) to make computers on a private network behind the UAG available outside the private network. If the UAG has only one public IP address, you can make the computers in the private network available by using ports to forward packets to the appropriate private IP address.

Suppose you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 172.16.0.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

Figure 99 Multiple Servers Behind NAT Example



14.1.1 What You Can Do in this Chapter

Use the **NAT** screens (see Section 14.2 on page 165) to view and manage the list of NAT rules and see their configuration details. You can also create new NAT rules and edit or delete existing ones.

14.1.2 What You Need to Know

NAT is also known as virtual server, port forwarding, or port translation.

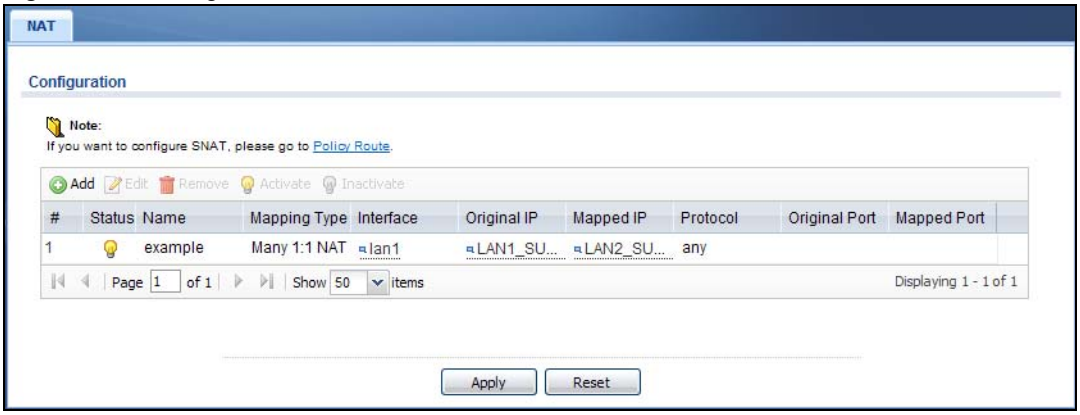
Finding Out More

- See Section 14.3 on page 169 for technical background information related to these screens.

14.2 The NAT Screen

The **NAT** summary screen provides a summary of all NAT rules and their configuration. In addition, this screen allows you to create new NAT rules and edit and delete existing NAT rules. To access this screen, login to the Web Configurator and click **Configuration > Network > NAT**. The following screen appears, providing a summary of the existing NAT rules.

Figure 100 Configuration > Network > NAT



The following table describes the labels in this screen.

Table 82 Configuration > Network > NAT

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the entry.
Mapping Type	This field displays what kind of NAT this entry performs: **Virtual Server**, **1:1 NAT**, or **Many 1:1 NAT**.
Interface	This field displays the interface on which packets for the NAT entry are received.
Original IP	This field displays the original destination IP address (or address object) of traffic that matches this NAT entry. It displays **any** if there is no restriction on the original destination IP address.
Mapped IP	This field displays the new destination IP address for the packet.
Protocol	This field displays the service used by the packets for this NAT entry. It displays **any** if there is no restriction on the services.
Original Port	This field displays the original destination port(s) of packets for the NAT entry. This field is blank if there is no restriction on the original destination port.
Mapped Port	This field displays the new destination port(s) for the packet. This field is blank if there is no restriction on the original destination port.

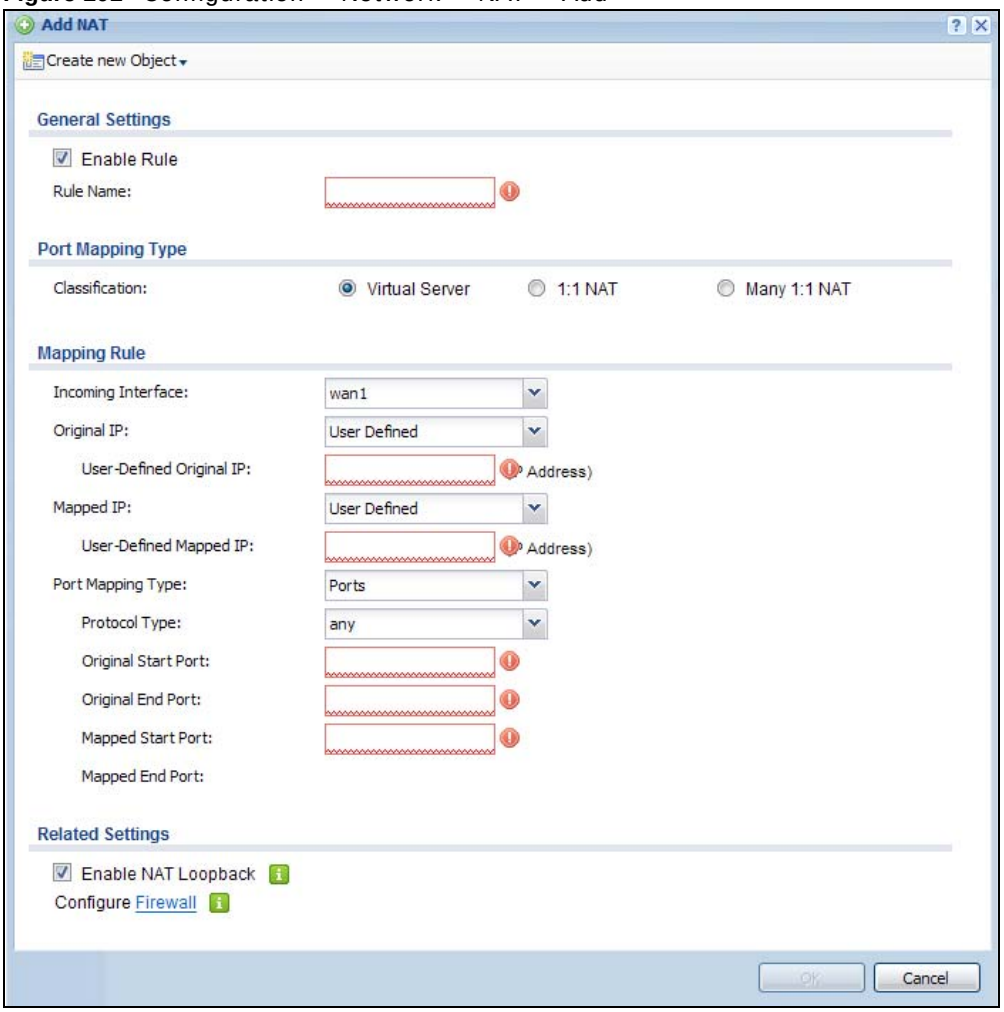
Table 82 Configuration > Network > NAT (continued)

LABEL	DESCRIPTION
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

14.2.1 The NAT Add/Edit Screen

The **NAT Add/Edit** screen lets you create new NAT rules and edit existing ones. To open this window, open the **NAT** summary screen. (See Section 14.2 on page 165.) Then, click on an **Add** icon or **Edit** icon to open the following screen.

Figure 101 Configuration > Network > NAT > Add



The following table describes the labels in this screen.

Table 83 Configuration > Network > NAT > Add

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable Rule	Use this option to turn the NAT rule on or off.

Table 83 Configuration > Network > NAT > Add (continued)

LABEL	DESCRIPTION
Rule Name	Type in the name of the NAT rule. The name is used to refer to the NAT rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Classification	Select what kind of NAT this rule is to perform. **Virtual Server** - This makes computers on a private network behind the UAG available to a public network outside the UAG (like the Internet). **1:1 NAT** - If the private network server will initiate sessions to the outside clients, select this to have the UAG translate the source IP address of the server's outgoing traffic to the same public IP address that the outside clients use to access the server. **Many 1:1 NAT -** If you have a range of private network servers that will initiate sessions to the outside clients and a range of public IP addresses, select this to have the UAG translate the source IP address of each server's outgoing traffic to the same one of the public IP addresses that the outside clients use to access the server. The private and public ranges must have the same number of IP addresses. One many 1:1 NAT rule works like multiple 1:1 NAT rules, but it eases configuration effort since you only create one rule.
Incoming Interface	Select the interface on which packets for the NAT rule must be received. It can be an Ethernet, VLAN, bridge, or PPPoE/PPTP interface.
Original IP	Specify the destination IP address of the packets received by this NAT rule's specified incoming interface. **any** - Select this to use all of the incoming interface's IP addresses including dynamic addresses or those of any virtual interfaces built upon the selected incoming interface. **User Defined** - Select this to manually enter an IP address in the **User Defined Original IP** field. For example, you could enter a static public IP assigned by the ISP without having to create a virtual interface for it. Host address - select a host address object to use the IP address it specifies. The list also includes address objects based on interface IPs. So for example you could select an address object based on a WAN interface even if it has a dynamic IP address.
User-Defined Original IP	This field is available if **Original IP** is **User Defined**. Type the destination IP address that this NAT rule supports.
Original IP Subnet/Range	This field displays for **Many 1:1 NAT**. Select the destination IP address subnet or IP address range that this NAT rule supports. The original and mapped IP address subnets or ranges must have the same number of IP addresses.
Mapped IP	Select to which translated destination IP address this NAT rule forwards packets. **User Defined** - this NAT rule supports a specific IP address, specified in the **User-Defined Mapped IP** field.
User-Defined Mapped IP	This field is available if **Mapped IP** is **User Defined**. Type the translated destination IP address that this NAT rule supports.
Mapped IP Subnet/Range	This field displays for **Many 1:1 NAT**. Select to which translated destination IP address subnet or IP address range this NAT rule forwards packets. The original and mapped IP address subnets or ranges must have the same number of IP addresses.

Table 83 Configuration > Network > NAT > Add (continued)

LABEL	DESCRIPTION
Port Mapping Type	Use the drop-down list box to select how many original destination ports this NAT rule supports for the selected destination IP address (**Original IP**). Choices are: **Any** - this NAT rule supports all the destination ports. **Service** - this NAT rule supports the destination port(s) used by the specified service(s). **Port** - this NAT rule supports one destination port. **Ports** - this NAT rule supports a range of destination ports. You might use a range of destination ports for unknown services or when one server supports more than one service. This field is read-only and displays **any** for **Many 1:1 NAT**.
Original Service	This field is available if **Port Mapping Type** is **Service**. Select the original service whose destination port(s) is supported by this NAT rule.
Mapped Service	This field is available if **Port Mapping Type** is **Service**. Select the translated service whose destination port(s) is supported if this NAT rule forwards the packet.
Protocol Type	This field is available if **Port Mapping Type** is **Port** or **Ports**. Select the protocol (**TCP**, **UDP**, or **any**) used by the service requesting the connection.
Original Port	This field is available if **Port Mapping Type** is **Port**. Enter the original destination port this NAT rule supports.
Mapped Port	This field is available if **Port Mapping Type** is **Port**. Enter the translated destination port if this NAT rule forwards the packet.
Original Start Port	This field is available if **Port Mapping Type** is **Ports**. Enter the beginning of the range of original destination ports this NAT rule supports.
Original End Port	This field is available if **Port Mapping Type** is **Ports**. Enter the end of the range of original destination ports this NAT rule supports.
Mapped Start Port	This field is available if **Port Mapping Type** is **Ports**. Enter the beginning of the range of translated destination ports if this NAT rule forwards the packet.
Mapped End Port	This field is available if **Port Mapping Type** is **Ports**. Enter the end of the range of translated destination ports if this NAT rule forwards the packet. The original port range and the mapped port range must be the same size.
Enable NAT Loopback	Enable NAT loopback to allow users connected to any interface (instead of just the specified **Incoming Interface**) to use the NAT rule's specified **Original IP** address to access the **Mapped IP** device. For users connected to the same interface as the **Mapped IP** device, the UAG uses that interface's IP address as the source address for the traffic it sends from the users to the **Mapped IP** device. For example, if you configure a NAT rule to forward traffic from the WAN to a LAN server, enabling NAT loopback allows users connected to other interfaces to also access the server. For LAN users, the UAG uses the LAN interface's IP address as the source address for the traffic it sends to the LAN server. See NAT Loopback on page 169 for more details. If you do not enable NAT loopback, this NAT rule only applies to packets received on the rule's specified incoming interface.
Firewall	By default the firewall blocks incoming connections from external addresses. After you configure your NAT rule settings, click the **Firewall** link to configure a firewall rule to allow the NAT rule's traffic to come in. The UAG checks NAT rules before it applies To-Device firewall rules, so To-Device firewall rules do not apply to traffic that is forwarded by NAT rules. The UAG still checks other firewall rules according to the source IP address and mapped IP address.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to return to the **NAT** summary screen without creating the NAT rule (if it is new) or saving any changes (if it already exists).

14.3 NAT Technical Reference

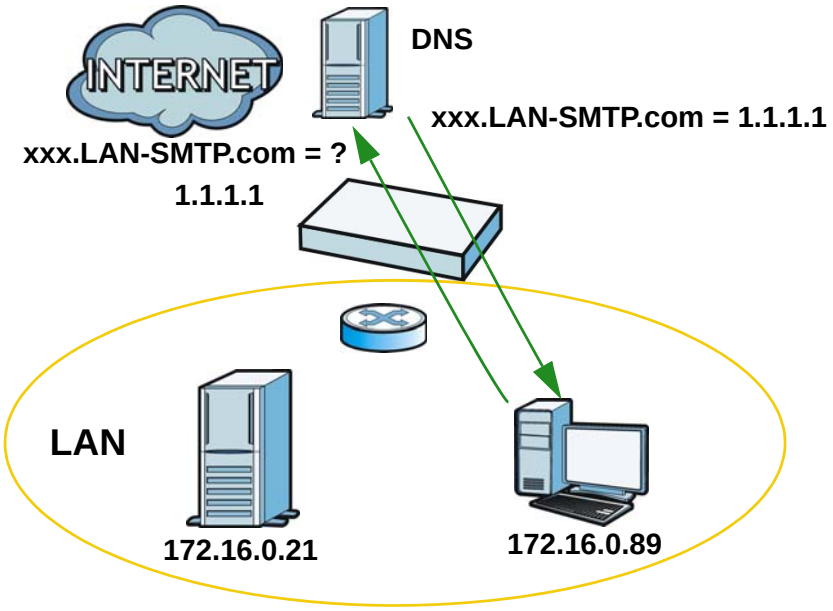
Here is more detailed information about NAT on the UAG.

NAT Loopback

Suppose an NAT 1:1 rule maps a public IP address to the private IP address of a LAN SMTP e-mail server to give WAN users access. NAT loopback allows other users to also use the rule's original IP to access the mail server.

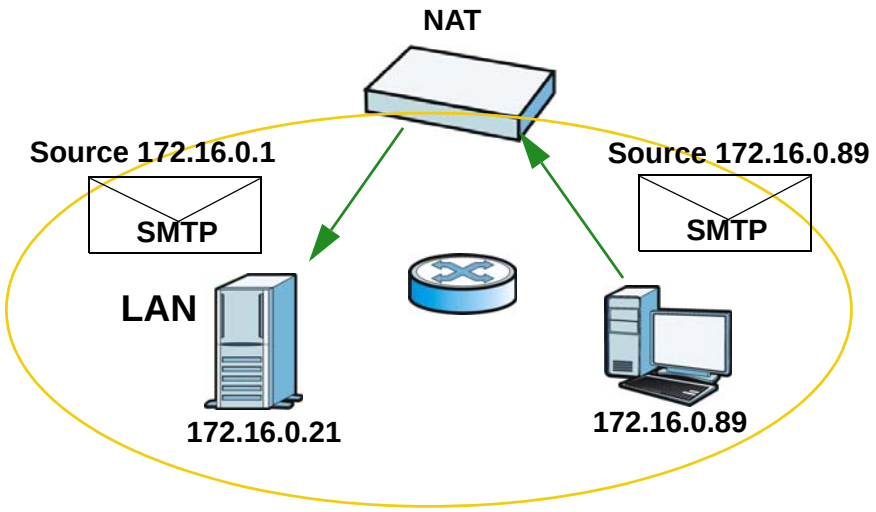
For example, a LAN user's computer at IP address 172.16.0.89 queries a public DNS server to resolve the SMTP server's domain name (xxx.LAN-SMTP.com in this example) and gets the SMTP server's mapped public IP address of 1.1.1.1.

Figure 102 LAN Computer Queries a Public DNS Server



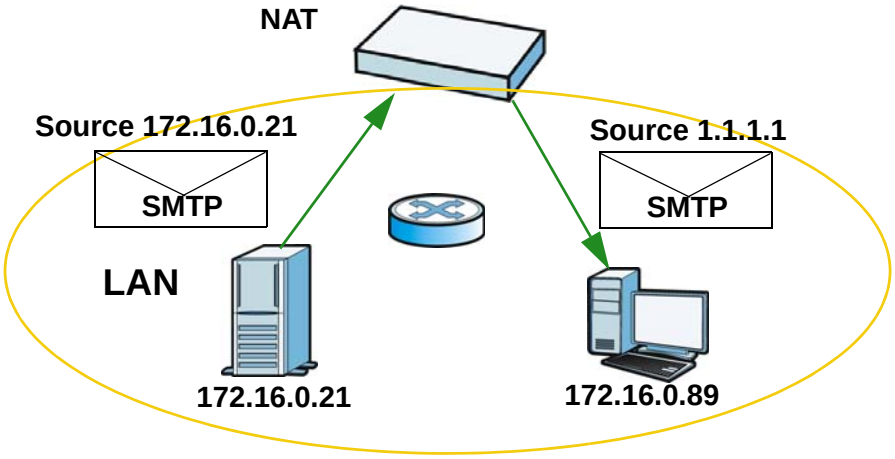
The LAN user's computer then sends traffic to IP address 1.1.1.1. NAT loopback uses the IP address of the UAG's lan1 interface (172.16.0.1) as the source address of the traffic going from the LAN users to the LAN SMTP server.

Figure 103 LAN to LAN Traffic



The LAN SMTP server replies to the UAG's LAN IP address and the UAG changes the source address to 1.1.1.1 before sending it to the LAN user. The return traffic's source matches the original destination address (1.1.1.1). If the SMTP server replied directly to the LAN user without the traffic going through NAT, the source would not match the original destination address which would cause the LAN user's computer to shut down the session.

Figure 104 LAN to LAN Return Traffic



15

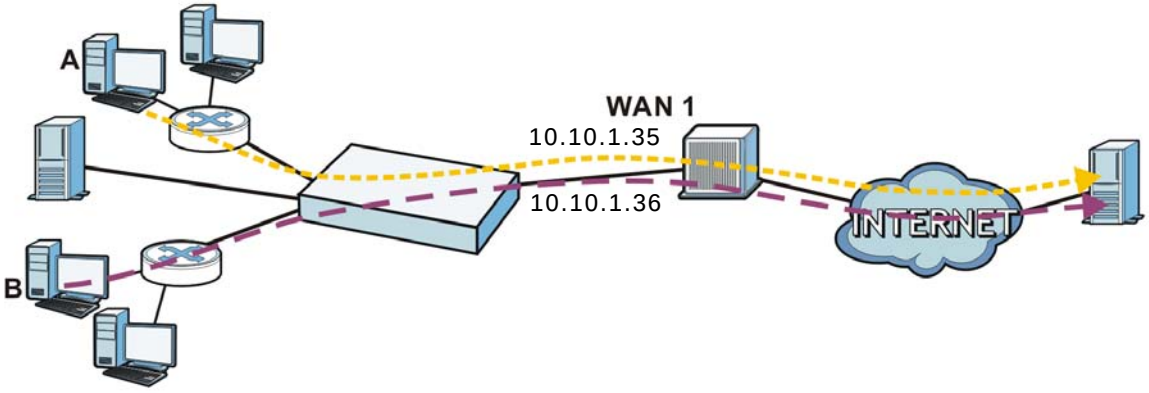
VPN 1-1 Mapping

15.1 VPN 1-1 Mapping Overview

VPN 1-1 mapping allows an authenticated user in your network to access the Internet or an external server using a public IP address different from the one used by the UAG's WAN interface. With VPN 1-1 mapping, each user that logs into the UAG and matches a pre-configured mapping rule can obtain an individual public IP address.

For example, users **A** and **B** are behind the UAG and both want to use a unique WAN IP address to access a public server through the UAG's WAN1 interface. After the user is authenticated by the UAG and meets the criteria in a VPN 1-1 mapping rule, the UAG applies the rule settings and assigns a public IP address to the user. Outgoing traffic from user **A** will then be sent through the WAN1 interface using the mapped public IP address 10.10.1.35. Outgoing traffic from user **B** will be sent through the WAN1 interface using the mapped public IP address 10.10.1.36.

Figure 105 VPN 1-1 Mapping Example



15.1.1 What You Can Do in this Chapter

- Use the **VPN 1-1 Mapping** screens (see Section 15.2 on page 172) to enable and configure VPN 1-1 mapping to assign a public IP address to each of users that match the rules.
- Use the **VPN 1-1 Mapping > Profile** screen (see Section 15.3 on page 174) to configure a pool profile which defines the public IP address(es) that the UAG assigns to the matched users and the interface through which the user's traffic is forwarded.

15.1.2 What You Need to Know

VPN 1-1 Mapping, Firewall and Policy Route

With VPN 1-1 mapping, the relevant packet flow for traffic from the matched user is:

1 Firewall

2 Policy Route

3 VPN 1-1 Mapping

If you set a policy route to the same user/user group as a VPN 1-1 mapping rule, the UAG checks the policy routing rules first and forwards the traffic to a specified next-hop if matched. You need to make sure there is no firewall rule(s) blocking the traffic from the matched user or user group.

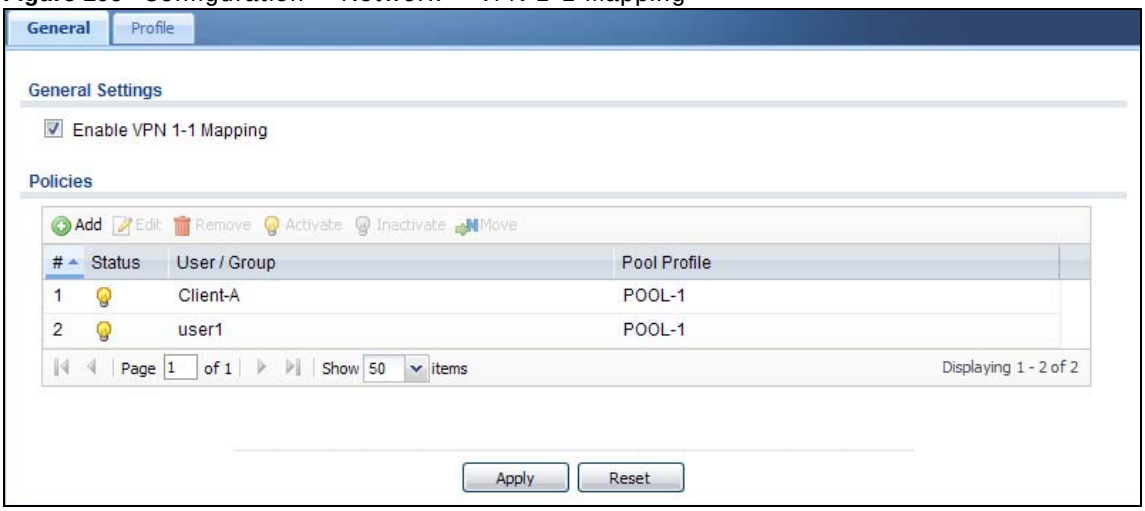
To make the example in Figure 105 on page 171 work, make sure you have the following settings. For traffic between **lan1** or **lan2** and **wan1**:

- a from LAN1/LAN2 to WAN firewall rule (default) to allow any traffic from the user A/B from **lan1** or **lan2** to **wan1**. Responses to this request are allowed automatically.
- a VPN 1-1 mapping rule to forward any traffic from the user A/B through the wan1 interface using a unique public IP address.

15.2 The VPN 1-1 Mapping General Screen

The **VPN 1-1 Mapping** summary screen provides a summary of all VPN 1-1 mapping rules and their configuration. In addition, this screen allows you to create new VPN 1-1 mapping rules and edit and delete existing VPN 1-1 mapping rules. To access this screen, login to the Web Configurator and click **Configuration > Network > VPN 1-1 Mapping**. The following screen appears, providing a summary of the existing VPN 1-1 mapping rules.

Figure 106 Configuration > Network > VPN 1-1 Mapping



The following table describes the labels in this screen.

Table 84 Configuration > Network > VPN 1-1 Mapping

LABEL	DESCRIPTION
Enable VPN 1-1 Mapping	Select this option to enable VPN 1-1 mapping on the UAG.
Add	Click this to create a new entry.

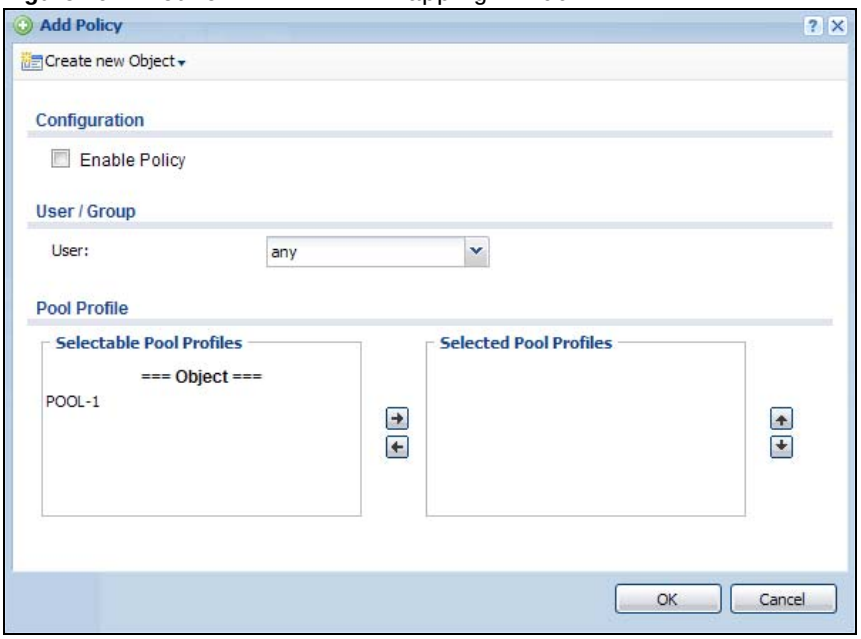
Table 84 Configuration > Network > VPN 1-1 Mapping (continued)

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
User / Group	This field displays the name of the user or user group object to which this rule is applied.
Pool Profile	This field displays the name of the pool profile used by this rule.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

15.2.1 The VPN 1-1 Mapping Edit Screen

Click **Network > VPN 1-1 Mapping** to open the **VPN 1-1 Mapping > General** screen. Then click the **Add** or **Edit** icon to open the **VPN 1-1 Mapping Add/Edit Policy** screen where you can configure the rule.

Figure 107 Network > VPN 1-1 Mapping > Add



The following table describes the labels in this screen.

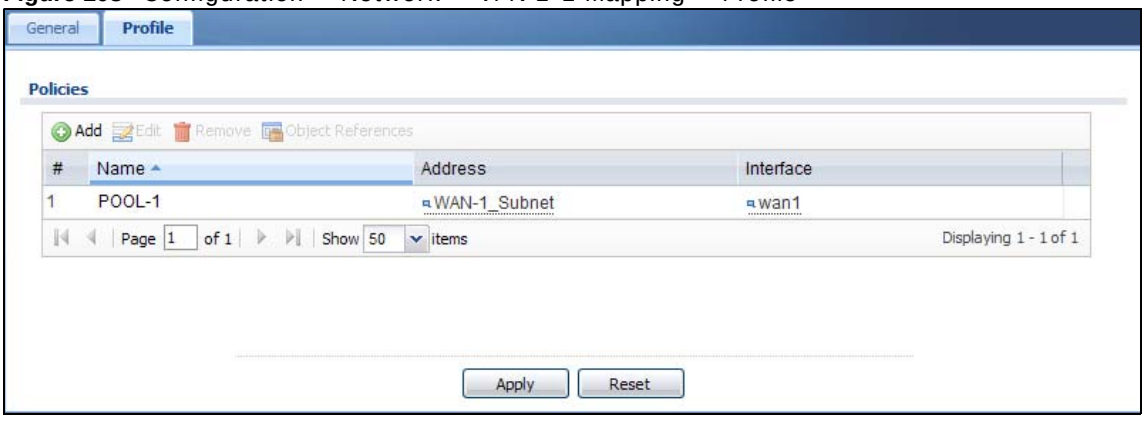
Table 85 Network > VPN 1-1 Mapping > Add

LABEL	DESCRIPTION
Create New Object	Click this button to create any new user/group objects that you need to use in this screen.
Enable Policy	Use this option to turn the VPN 1-1 mapping rule on or off.
User/Group	Use the drop-down list box to select the individual or group for which you want to use this rule. Select **any** to have the mapping rule apply to all of the traffic that the UAG receives from any user.
Pool Profile	The **Selectable Pool Profiles** list displays the name(s) of the pool profile(s) you can select for this mapping rule. To associate a pool profile to this mapping rule, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Selected Pool Profiles** list. To remove a pool profile, select the name(s) in the **Selected Pool Profiles** list and click the left arrow button. You can also use the up or down arrow button to change the order of members in the **Selected Pool Profiles** list.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

15.3 The VPN 1-1 Mapping Profile Screen

The **VPN 1-1 Mapping Profile** summary screen provides a summary of all pool profiles for VPN 1-1 mapping and their configuration. In addition, this screen allows you to create new pool profiles and edit and delete existing profiles. A pool profile defines the public IP address(es) that the UAG assigns to the matched users and the interface through which the user's traffic is forwarded. To access this screen, login to the Web Configurator and click **Configuration > Network > VPN 1-1 Mapping > Profile**. The following screen appears, providing a summary of the existing IP address pool profiles.

Figure 108 Configuration > Network > VPN 1-1 Mapping > Profile



The following table describes the labels in this screen.

Table 86 Configuration > Network > VPN 1-1 Mapping > Profile

LABEL	DESCRIPTION
Add	Click this to add an entry to the table. If you click **Add** without selecting an entry in advance then the new entry appears as the first entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific entry.
Name	This field displays a descriptive name for the profile. Enter a descriptive name to identify the profile.
Address	This field displays the name of the IP address object the profile is set to use. Select an address object that presents the IP address(es), which can be assigned to the matched users by the UAG. Note: You cannot select an address group object at the time of writing. Note: It's recommended that the IP addresses of the selected address object and the WAN interface are in the same subnet so that the UAG can receive response packets from the remote node.
Interface	This field displays the name of the interface the profile is set to use. Select the interface through which the UAG sends traffic from the matched users.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

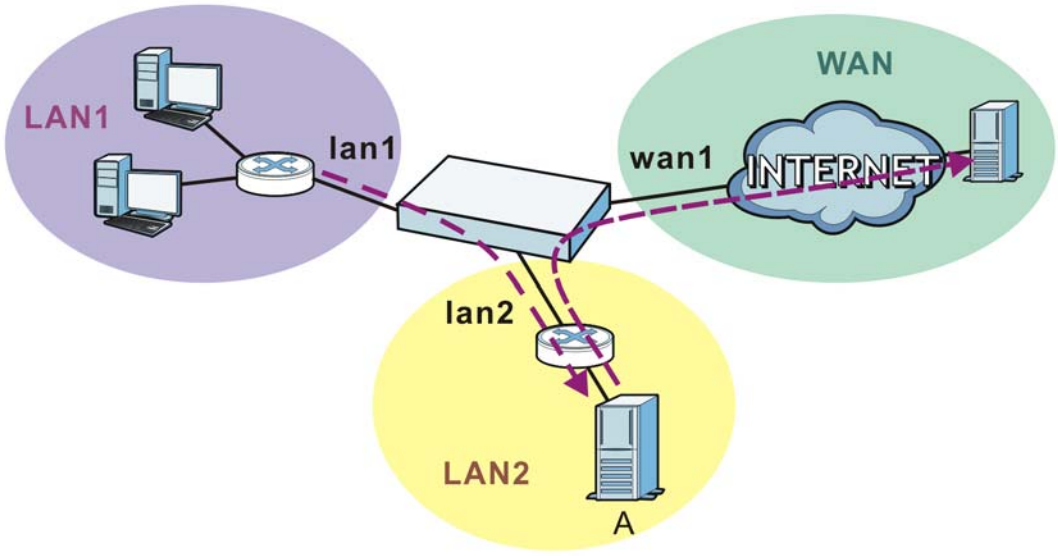
16

HTTP Redirect

16.1 Overview

HTTP redirect forwards the client's HTTP request (except HTTP traffic destined for the UAG) to a web proxy server. In the following example, proxy server **A** is connected to the **lan2** interface in the **LAN2** zone. When a client connected to the **lan1** interface in the **LAN1** zone wants to open a web page, its HTTP request is redirected to proxy server **A** first. If proxy server **A** cannot find the web page in its cache, a policy route allows it to access the Internet to get them from a server. Proxy server **A** then forwards the response to the client.

Figure 109 HTTP Redirect Example



16.1.1 What You Can Do in this Chapter

Use the **HTTP Redirect** screens (see Section 16.2 on page 177) to display and edit the HTTP redirect rules.

16.1.2 What You Need to Know

Web Proxy Server

A proxy server helps client devices make indirect requests to access the Internet or outside network resources/services. A proxy server can act as a firewall or an ALG (application layer gateway) between the private network and the Internet or other networks. It also keeps hackers from knowing internal IP addresses.

A client connects to a web proxy server each time he/she wants to access the Internet. The web proxy provides caching service to allow quick access and reduce network usage. The proxy checks its local cache for the requested web resource first. If it is not found, the proxy gets it from the specified server and forwards the response to the client.

HTTP Redirect, Firewall and Policy Route

With HTTP redirect, the relevant packet flow for HTTP traffic is:

1. Firewall
2. HTTP Redirect
3. Policy Route

Even if you set a policy route to the same incoming interface and service as a HTTP redirect rule, the UAG checks the HTTP redirect rules first and forwards HTTP traffic to a proxy server if matched. You need to make sure there is no firewall rule(s) blocking the HTTP requests from the client to the proxy server.

You also need to manually configure a policy route to forward the HTTP traffic from the proxy server to the Internet. To make the example in Figure 109 on page 176 work, make sure you have the following settings.

For HTTP traffic between **lan1** and **lan2**:

- a from LAN1 to LAN2 firewall rule to allow HTTP requests from **lan1** to **lan2**. Responses to this request are allowed automatically.
- a HTTP redirect rule to forward HTTP traffic from **lan1** to proxy server **A**.

For HTTP traffic between **lan2** and **wan1**:

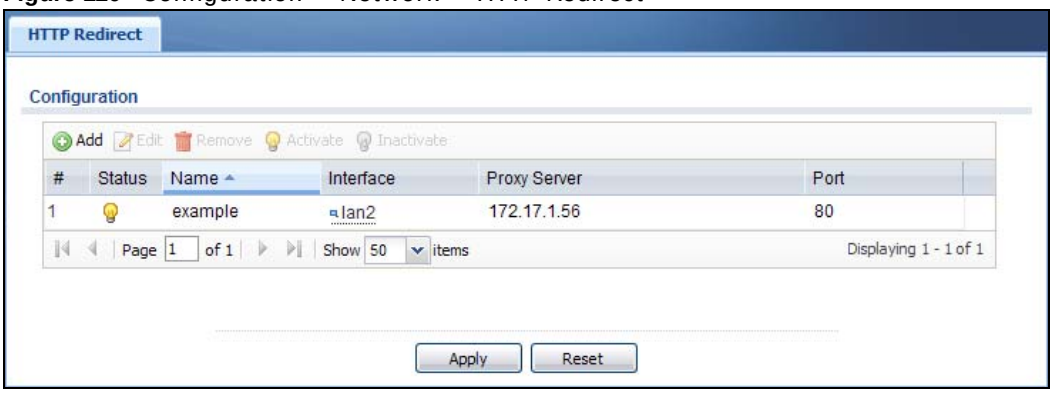
- a from LAN2 to WAN firewall rule (default) to allow HTTP requests from **lan2** to **wan1**. Responses to these requests are allowed automatically.
- a policy route to forward HTTP traffic from proxy server **A** to the Internet.

16.2 The HTTP Redirect Screen

To configure redirection of a HTTP request to a proxy server, click **Configuration > Network > HTTP Redirect**. This screen displays the summary of the HTTP redirect rules.

Note: You can configure up to one HTTP redirect rule for each (incoming) interface.

Figure 110 Configuration > Network > HTTP Redirect



The following table describes the labels in this screen.

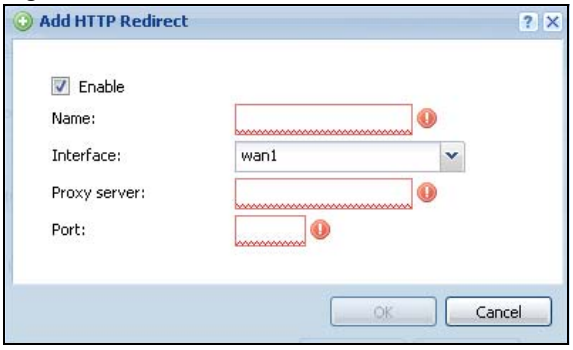
Table 87 Configuration > Network > HTTP Redirect

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This is the descriptive name of a rule.
Interface	This is the interface on which the request must be received.
Proxy Server	This is the IP address of the proxy server.
Port	This is the service port number used by the proxy server.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

16.2.1 The HTTP Redirect Edit Screen

Click **Network > HTTP Redirect** to open the **HTTP Redirect** screen. Then click the **Add** or **Edit** icon to open the **HTTP Redirect Edit** screen where you can configure the rule.

Figure 111 Network > HTTP Redirect > Edit



The following table describes the labels in this screen.

Table 88 Network > HTTP Redirect > Edit

LABEL	DESCRIPTION
Enable	Use this option to turn the HTTP redirect rule on or off.
Name	Enter a name to identify this rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Interface	Select the interface on which the HTTP request must be received for the UAG to forward it to the specified proxy server.
Proxy Server	Enter the IP address of the proxy server.
Port	Enter the port number that the proxy server uses.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

17

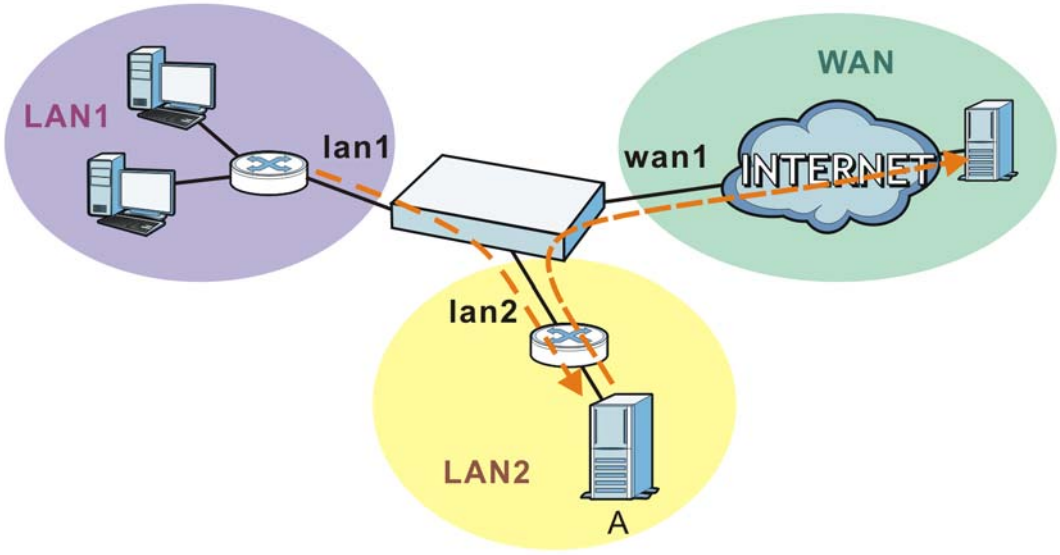
SMTP Redirect

17.1 Overview

SMTP redirect forwards the authenticated client's SMTP message to a SMTP server, that handles all outgoing e-mail messages. In the following example, SMTP server **A** is connected to the **lan2** interface in the **LAN2** zone. When a client connected to the **lan1** interface in the **LAN1** zone logs into the UAG and wants to send an e-mail, its SMTP message is redirected to SMTP server **A**. SMTP server **A** then sends it to a mail server, where the message will be delivered to the recipient.

The UAG forwards SMTP traffic using TCP port 25.

Figure 112 SMTP Redirect Example



17.1.1 What You Can Do in this Chapter

Use the **SMTP Redirect** screens (see Section 17.2 on page 181) to display and edit the SMTP redirect rules.

17.1.2 What You Need to Know

SMTP

Simple Mail Transfer Protocol (SMTP) is the Internet's message transport standard. It controls the sending of e-mail messages between servers. E-mail clients (also called e-mail applications) then use mail server protocols such as POP (Post Office Protocol) or IMAP (Internet Message Access Protocol) to retrieve e-mail. E-mail clients also generally use SMTP to send messages to a mail

server. The older POP2 requires SMTP for sending messages while the newer POP3 can be used with or without it. This is why many e-mail applications require you to specify both the SMTP server and the POP or IMAP server (even though they may actually be the same server).

SMTP Redirect, Firewall and Policy Route

With SMTP redirect, the relevant packet flow for SMTP traffic is:

1. Firewall
2. SMTP Redirect
3. Policy Route

Even if you set a policy route to the same incoming interface and service as a SMTP redirect rule, the UAG checks the SMTP redirect rules first and forwards SMTP traffic to a SMTP server if matched. You need to make sure there is no firewall rule(s) blocking the SMTP traffic from the client to the SMTP server.

You also need to manually configure a policy route to forward the SMTP traffic from the SMTP server to the Internet. To make the example in Figure 112 on page 180 work, make sure you have the following settings.

For SMTP traffic between **lan1** and **lan2**:

- a from LAN1 to LAN2 firewall rule to allow SMTP messages from **lan1** to **lan2**. Responses to this request are allowed automatically.
- a SMTP redirect rule to forward SMTP traffic from **lan1** to SMTP server **A**.

For SMTP traffic between **lan2** and **wan1**:

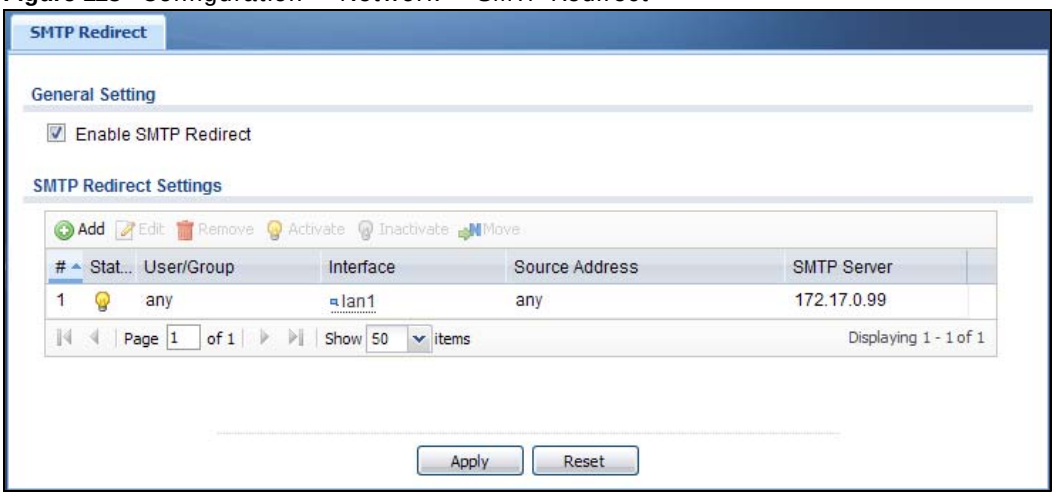
- a from LAN2 to WAN firewall rule (default) to allow SMTP messages from **lan2** to **wan1**. Responses to these requests are allowed automatically.
- a policy route to forward SMTP messages from SMTP server **A** to the Internet.

17.2 The SMTP Redirect Screen

To configure redirection of a SMTP message to a SMTP server, click **Configuration > Network > SMTP Redirect**. This screen displays the summary of the SMTP redirect rules.

Note: You can configure up to one SMTP redirect rule for each (incoming) interface.

Figure 113 Configuration > Network > SMTP Redirect



The following table describes the labels in this screen.

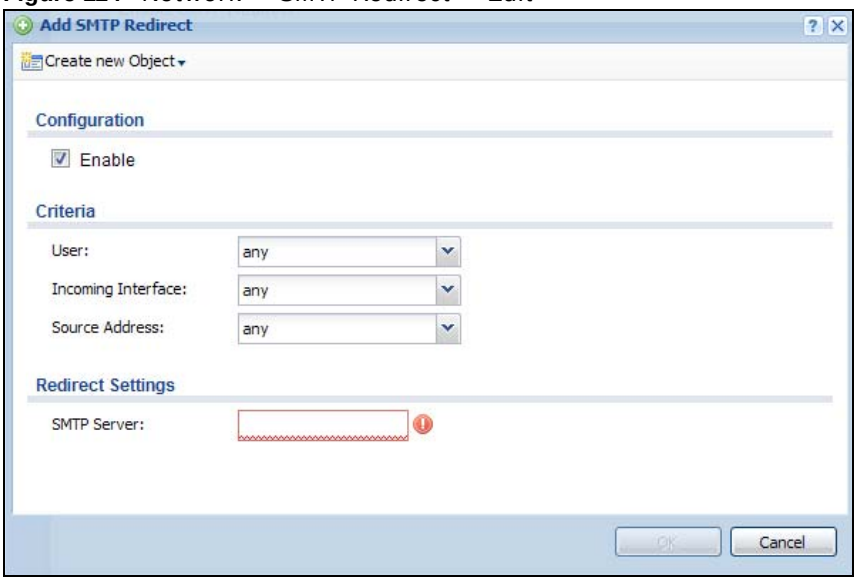
Table 89 Configuration > Network > SMTP Redirect

LABEL	DESCRIPTION
Enable SMTP Redirect	Select this option to turn on the SMTP redirect feature on the UAG.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
User/Group	This is the user account or user group name to whose SMTP traffic this rule is applied.
Incoming Interface	This is the name of the interface on which the SMTP traffic must be received.
Source Address	This is the name of the source IP address object from which the SMTP traffic should be sent. If **any** displays, the rule is effective for every source.
SMTP Server	This is the IP address of the SMTP server to which the matched SMTP traffic is forwarded.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

17.2.1 The SMTP Redirect Edit Screen

Click **Network > SMTP Redirect** to open the **SMTP Redirect** screen. Then click the **Add** or **Edit** icon to open the **SMTP Redirect Edit** screen where you can configure the rule.

Figure 114 Network > SMTP Redirect > Edit



The following table describes the labels in this screen.

Table 90 Network > SMTP Redirect > Edit

LABEL	DESCRIPTION
Enable	Use this option to turn the SMTP redirect rule on or off.
User	Use the drop-down list box to select the individual user or user group for which you want to use this rule. Select **any** to have the SMTP redirect rule apply to all of the SMTP messages that the UAG receives from any user.
Incoming Interface	Select the interface on which the SMTP traffic must be received for the UAG to forward it to the specified SMTP server.
Source Address	Select the source address or address group for whom this rule applies. Use **Create new Object** if you need to configure a new one. Select **any** if the rule is effective for every source.
SMTP Server	Enter the IP address of the SMTP server.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

18

ALG

18.1 ALG Overview

Application Layer Gateway (ALG) allows the following application to operate properly through the UAG's NAT.

- FTP - File Transfer Protocol - an Internet file transfer service.

The ALG feature is only needed for traffic that goes through the UAG's NAT.

18.1.1 What You Can Do in this Chapter

Use the **ALG** screen (Section 18.2 on page 185) to set up the FTP ALG settings.

18.1.2 What You Need to Know

Application Layer Gateway (ALG), NAT and Firewall

The UAG can function as an Application Layer Gateway (ALG) to allow certain NAT un-friendly applications to operate properly through the UAG's NAT and firewall. The UAG dynamically creates an implicit NAT session and firewall session for the application's traffic from the WAN to the LAN. The ALG on the UAG supports all of the UAG's NAT mapping types.

FTP ALG

The FTP ALG allows TCP packets with a specified port destination to pass through. If the FTP server is located on the LAN, you must also configure NAT (port forwarding) and firewall rules if you want to allow access to the server from the WAN.

ALG and Trunks

If you send your ALG-managed traffic through an interface trunk and all of the interfaces are set to active, you can configure routing policies to specify which interface the ALG-managed traffic uses.

You could also have a trunk with one interface set to active and a second interface set to passive. The UAG does not automatically change ALG-managed connections to the second (passive) interface when the active interface's connection goes down. When the active interface's connection fails, the client needs to re-initialize the connection through the second interface (that was set to passive) in order to have the connection go through the second interface.

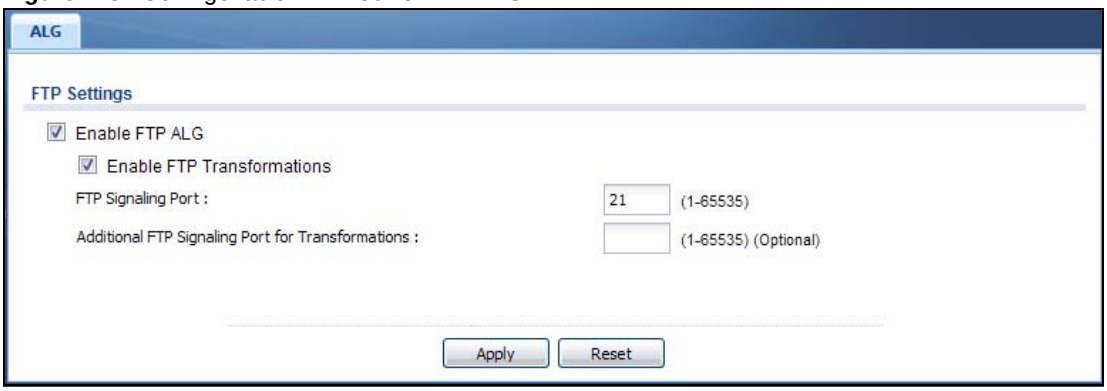
18.1.3 Before You Begin

You must also configure the firewall and enable NAT in the UAG to allow sessions initiated from the WAN.

18.2 The ALG Screen

Click **Configuration > Network > ALG** to open the **ALG** screen. Use this screen to turn the ALG off or on, configure the port numbers to which it applies.

Figure 115 Configuration > Network > ALG



The following table describes the labels in this screen.

Table 91 Configuration > Network > ALG

LABEL	DESCRIPTION
Enable FTP ALG	Turn on the FTP ALG to detect FTP (File Transfer Program) traffic and help build FTP sessions through the UAG's NAT.
Enable FTP Transformations	Select this option to have the UAG modify IP addresses and port numbers embedded in the FTP data payload to match the UAG's NAT environment. Clear this option if you have an FTP device or server that will modify IP addresses and port numbers embedded in the FTP data payload to match the UAG's NAT environment.
FTP Signaling Port	If you are using a custom TCP port number (not 21) for FTP traffic, enter it here.
Additional FTP Signaling Port for Transformations	If you are also using FTP on an additional TCP port number, enter it here.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

19

UPnP

19.1 Overview

The UAG supports both UPnP and NAT-PMP to permit networking devices to discover each other and connect seamlessly.

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use. A gateway that supports UPnP is called Internet Gateway Device (IGD). The standardized Device Control Protocol (DCP) is defined by the UPnP Forum for IGDs to configure port mapping automatically.

NAT Port Mapping Protocol (NAT-PMP), introduced by Apple and implemented in current Apple products, is used as an alternative NAT traversal solution to the UPnP IGD protocol. NAT-PMP runs over UDP port 5351. NAT-PMP is much simpler than UPnP IGD and mainly designed for small home networks. It allows a client behind a NAT router to retrieve the router's public IP address and port number and make them known to the peer device with which it wants to communicate. The client can automatically configure the NAT router to create a port mapping to allow the peer to contact it.

19.2 What You Need to Know

UPnP hardware is identified as an icon in the Network Connections folder (Windows XP). Each UPnP compatible device installed on your network will appear as a separate icon. Selecting the icon of a UPnP device will allow you to access the information and properties of that device.

19.2.1 NAT Traversal

UPnP NAT traversal automates the process of allowing an application to operate through NAT. UPnP network devices can automatically configure network addressing, announce their presence in the network to other UPnP devices and enable exchange of simple product and service descriptions. NAT traversal allows the following:

- Dynamic port mapping
- Learning public IP addresses
- Assigning lease times to mappings

Windows Messenger is an example of an application that supports NAT traversal and UPnP.

See the NAT chapter for more information on NAT.

19.2.2 Cautions with UPnP

The automated nature of NAT traversal applications in establishing their own services and opening firewall ports may present network security issues. Network information and configuration may also be obtained and modified by users in some network environments.

When a UPnP device joins a network, it announces its presence with a multicast message. For security reasons, the UAG allows multicast messages on the LAN only.

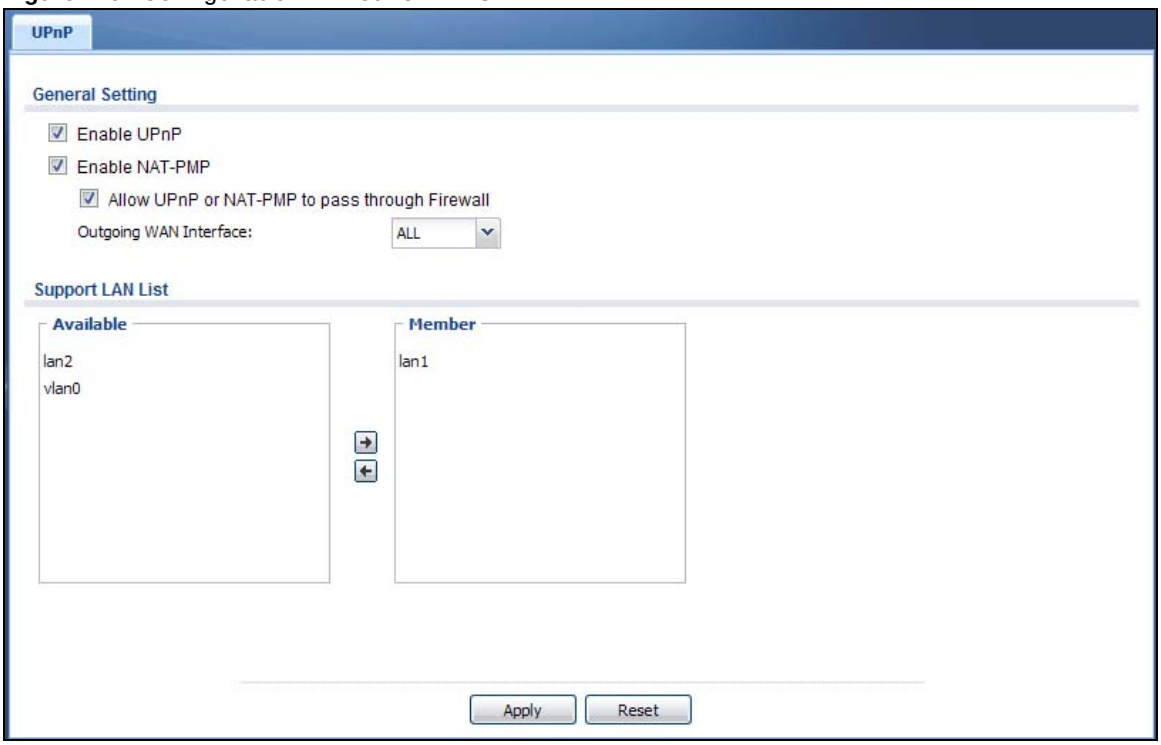
All UPnP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP if this is not your intention.

19.3 UPnP Screen

Use this screen to enable UPnP and NAT-PMP on your UAG.

Click **Configuration > Network > UPnP** to display the screen shown next.

Figure 116 Configuration > Network > UPnP



The following table describes the fields in this screen.

Table 92 Configuration > Network > UPnP

LABEL	DESCRIPTION
Enable UPnP	Select this check box to activate UPnP on the UAG. Be aware that anyone could use a UPnP application to open the web configurator's login screen without entering the UAG's IP address (although you must still enter the password to access the web configurator).
Enable NAT-PMP	Select this check box to activate NAT-PMP on the UAG. Be aware that anyone could use a NAT-PMP application to open the web configurator's login screen without entering the UAG's IP address (although you must still enter the password to access the web configurator).
Allow UPnP or NAT-PMP to pass through Firewall	Select this check box to allow traffic from UPnP-enabled or NAT-PMP-enabled applications to bypass the firewall. Clear this check box to have the firewall block all UPnP or NAT-PMP application packets (for example, MSN packets).
Outgoing WAN Interface	Select through which WAN interface(s) you want to send out traffic from UPnP-enabled or NAT-PMP-enabled applications. If the WAN interface you select loses its connection, the UAG attempts to use the other WAN interface. If the other WAN interface also does not work, the UAG drops outgoing packets from UPnP-enabled or NAT-PMP-enabled applications.
Support LAN List	The **Available** list displays the name(s) of the internal interface(s) on which the UAG supports UPnP and/or NAT-PMP. To enable UPnP and/or NAT-PMP on an interface, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Member** list. To remove an interface, select the name(s) in the **Member** list and click the left arrow button.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

19.4 Technical Reference

The sections show examples of using UPnP.

19.4.1 Using UPnP in Windows XP Example

This section shows you how to use the UPnP feature in Windows XP. You must already have UPnP installed in Windows XP and UPnP activated on the UAG.

Make sure the computer is connected to a LAN port of the UAG. Turn on your computer and the UAG.

19.4.1.1 Auto-discover Your UPnP-enabled Network Device

1 Click **start** and **Control Panel**. Double-click **Network Connections**. An icon displays under Internet Gateway.

2 Right-click the icon and select **Properties**.

Figure 117 Network Connections

3 In the **Internet Connection Properties** window, click **Settings** to see the port mappings there were automatically created.

Figure 118 Internet Connection Properties

4 You may edit or delete the port mappings or click **Add** to manually add port mappings.

Figure 119 Internet Connection Properties: Advanced Settings

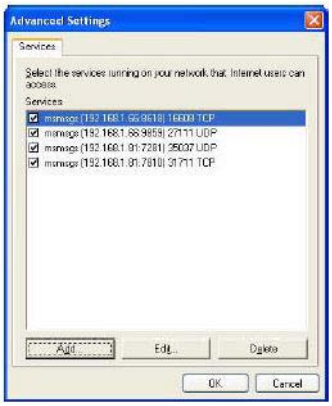
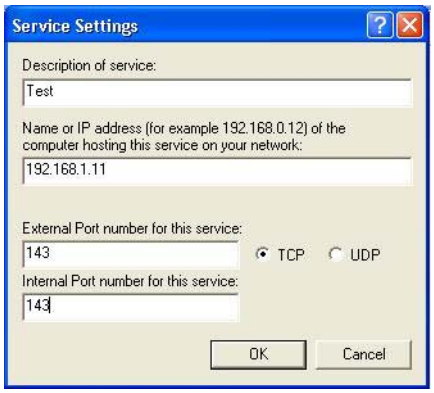


Figure 120 Internet Connection Properties: Advanced Settings: Add



Note: When the UPnP-enabled device is disconnected from your computer, all port mappings will be deleted automatically.

5 Select **Show icon in notification area when connected** option and click **OK**. An icon displays in the system tray.

Figure 121 System Tray Icon

6 Double-click on the icon to display your current Internet connection status.

Figure 122 Internet Connection Status

19.4.2 Web Configurator Easy Access

With UPnP, you can access the web-based configurator on the UAG without finding out the IP address of the UAG first. This comes helpful if you do not know the IP address of the UAG.

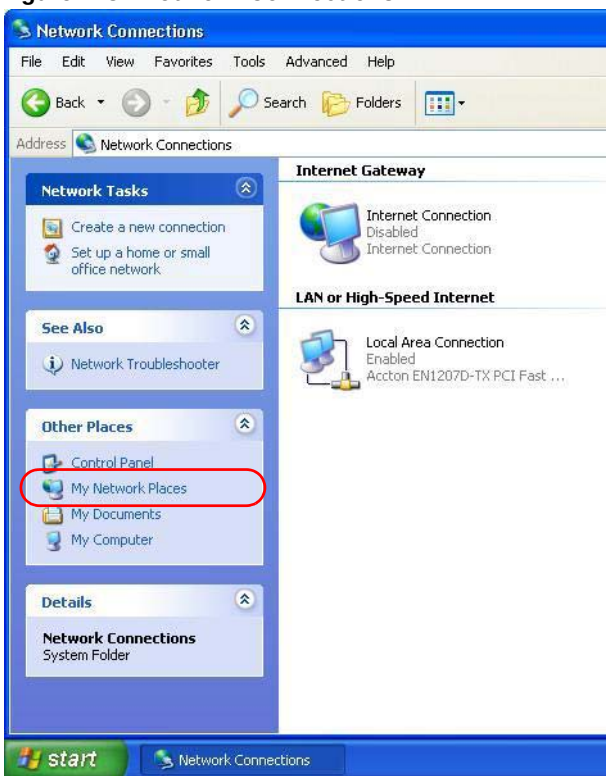
Follow the steps below to access the web configurator.

1 Click **Start** and then **Control Panel**.

2 Double-click **Network Connections**.

3 Select **My Network Places** under **Other Places**.

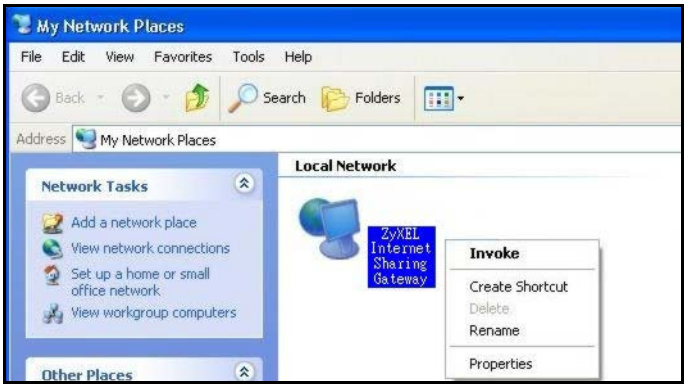
Figure 123 Network Connections



4 An icon with the description for each UPnP-enabled device displays under **Local Network**.

5 Right-click on the icon for your UAG and select **Invoke**. The web configurator login screen displays.

Figure 124 Network Connections: My Network Places



6 Right-click on the icon for your UAG and select **Properties**. A properties window displays with basic information about the UAG.

Figure 125 Network Connections: My Network Places: Properties: Example

20

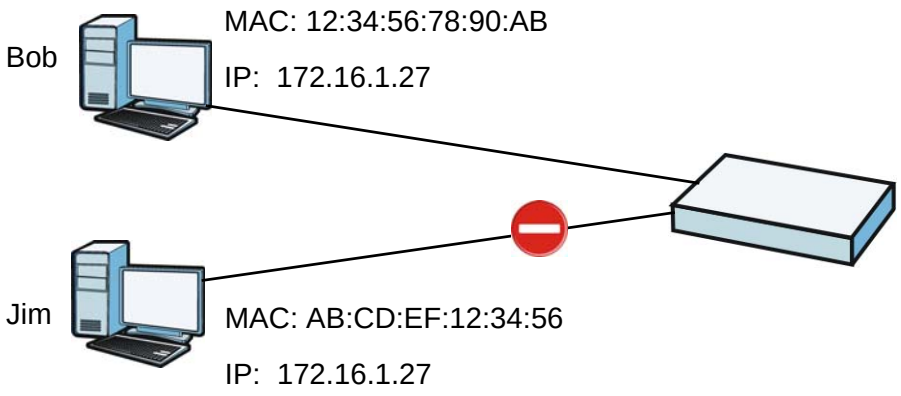
IP/MAC Binding

20.1 IP/MAC Binding Overview

IP address to MAC address binding helps ensure that only the intended devices get to use privileged IP addresses. The UAG uses DHCP to assign IP addresses and records to MAC address it assigned each IP address. The UAG then checks incoming connection attempts against this list. A user cannot manually assign another IP to his computer and use it to connect to the UAG.

Suppose you configure access privileges for IP address 172.16.1.27 and use static DHCP to assign it to Bob's computer's MAC address of 12:34:56:78:90:AB. IP/MAC binding drops traffic from any computer trying to use IP address 172.16.1.27 with another MAC address.

Figure 126 IP/MAC Binding Example



20.1.1 What You Can Do in this Chapter

- Use the **Summary** and **Edit** screens (Section 20.2 on page 194) to bind IP addresses to MAC addresses.
- Use the **Exempt List** screen (Section 20.3 on page 196) to configure ranges of IP addresses to which the UAG does not apply IP/MAC binding.

20.1.2 What You Need to Know

DHCP

IP/MAC address bindings are based on the UAG's dynamic and static DHCP entries.

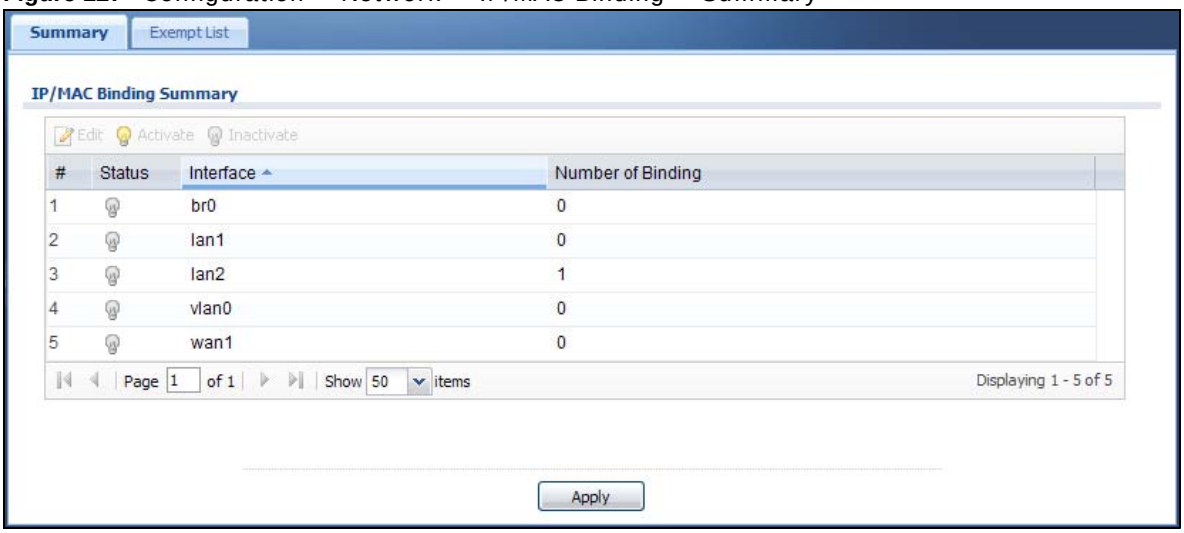
Interfaces Used With IP/MAC Binding

IP/MAC address bindings are grouped by interface. You can use IP/MAC binding with Ethernet, bridge, VLAN interfaces. You can also enable or disable IP/MAC binding and logging in an interface's configuration screen.

20.2 IP/MAC Binding Summary

Click **Configuration > Network > IP/MAC Binding** to open the **IP/MAC Binding Summary** screen. This screen lists the total number of IP to MAC address bindings for devices connected to each supported interface.

Figure 127 Configuration > Network > IP/MAC Binding > Summary



The following table describes the labels in this screen.

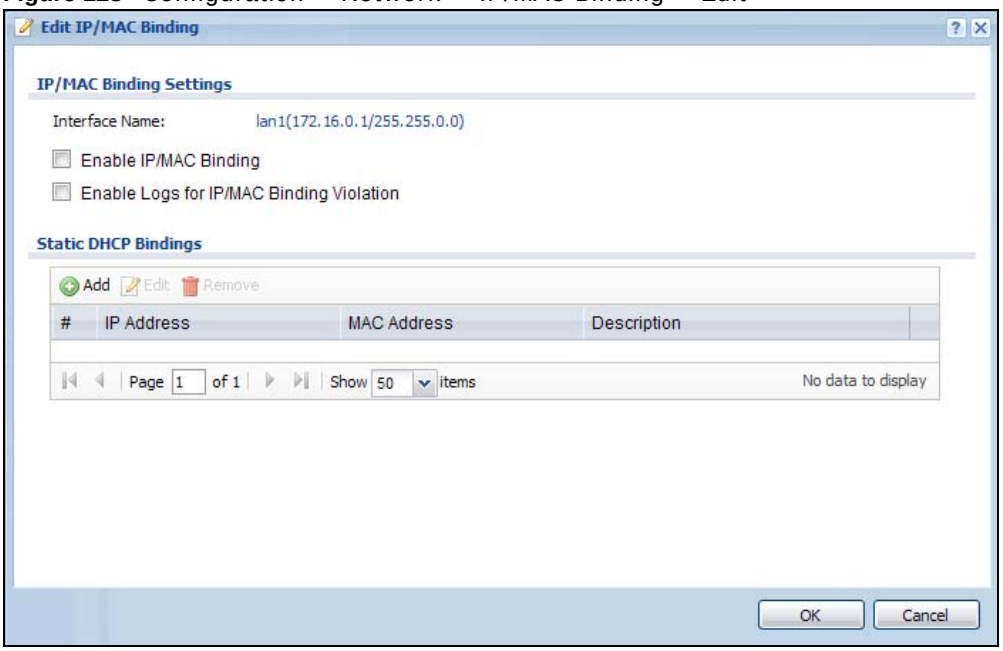
Table 93 Configuration > Network > IP/MAC Binding > Summary

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Interface	This is the name of an interface that supports IP/MAC binding.
Number of Binding	This field displays the interface's total number of IP/MAC bindings and IP addresses that the interface has assigned by DHCP.
Apply	Click **Apply** to save your changes back to the UAG.

20.2.1 IP/MAC Binding Edit

Click **Configuration > Network > IP/MAC Binding > Edit** to open the **IP/MAC Binding Edit** screen. Use this screen to configure an interface's IP to MAC address binding settings.

Figure 128 Configuration > Network > IP/MAC Binding > Edit



The following table describes the labels in this screen.

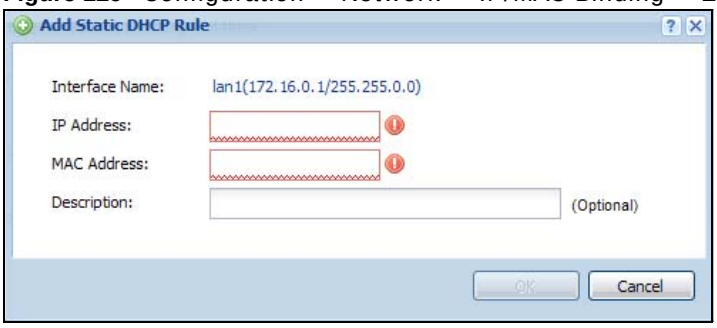
Table 94 Configuration > Network > IP/MAC Binding > Edit

LABEL	DESCRIPTION
IP/MAC Binding Settings	
Interface Name	This field displays the name of the interface within the UAG and the interface's IP address and subnet mask.
Enable IP/MAC Binding	Select this option to have this interface enforce links between specific IP addresses and specific MAC addresses. This stops anyone else from manually using a bound IP address on another device connected to this interface. Use this to make use only the intended users get to use specific IP addresses.
Enable Logs for IP/MAC Binding Violation	Select this option to have the UAG generate a log if a device connected to this interface attempts to use an IP address not assigned by the UAG.
Static DHCP Bindings	This table lists the bound IP and MAC addresses. The UAG checks this table when it assigns IP addresses. If the computer's MAC address is in the table, the UAG assigns the corresponding IP address. You can also access this table from the interface's edit screen.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
#	This is the index number of the static DHCP entry.
IP Address	This is the IP address that the UAG assigns to a device with the entry's MAC address.
MAC Address	This is the MAC address of the device to which the UAG assigns the entry's IP address.
Description	This helps identify the entry.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

20.2.2 Static DHCP Edit

Click **Configuration > Network > IP/MAC Binding > Edit** to open the **IP/MAC Binding Edit** screen. Click the **Add** or **Edit** icon to open the following screen. Use this screen to configure an interface's IP to MAC address binding settings.

Figure 129 Configuration > Network > IP/MAC Binding > Edit > Add



The following table describes the labels in this screen.

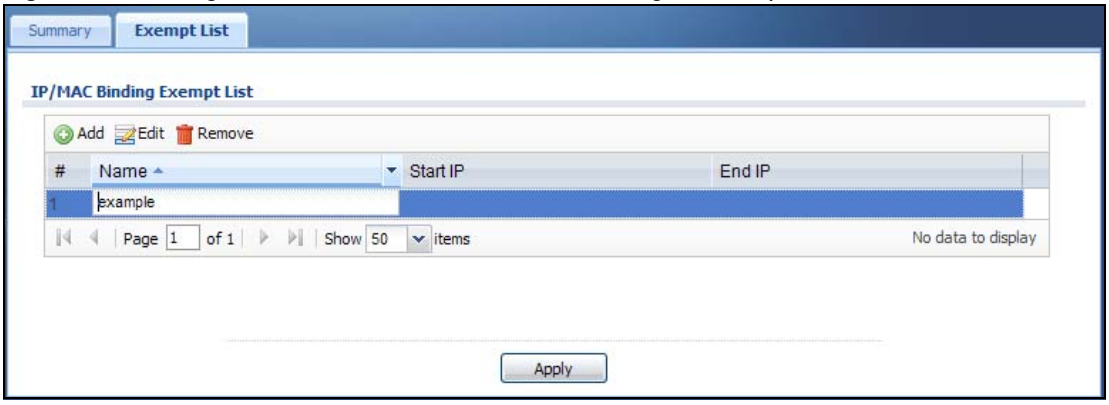
Table 95 Configuration > Network > IP/MAC Binding > Edit > Add

LABEL	DESCRIPTION
Interface Name	This field displays the name of the interface within the UAG and the interface's IP address and subnet mask.
IP Address	Enter the IP address that the UAG is to assign to a device with the entry's MAC address.
MAC Address	Enter the MAC address of the device to which the UAG assigns the entry's IP address.
Description	Enter up to 64 printable ASCII characters to help identify the entry. For example, you may want to list the computer's owner.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

20.3 IP/MAC Binding Exempt List

Click **Configuration > Network > IP/MAC Binding > Exempt List** to open the **IP/MAC Binding Exempt List** screen. Use this screen to configure ranges of IP addresses to which the UAG does not apply IP/MAC binding.

Figure 130 Configuration > Network > IP/MAC Binding > Exempt List



The following table describes the labels in this screen.

Table 96 Configuration > Network > IP/MAC Binding > Exempt List

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Click an entry or select it and click **Edit** to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
#	This is the index number of the IP/MAC binding list entry.
Name	Enter a name to help identify this entry.
Start IP	Enter the first IP address in a range of IP addresses for which the UAG does not apply IP/MAC binding.
End IP	Enter the last IP address in a range of IP addresses for which the UAG does not apply IP/MAC binding.
Apply	Click **Apply** to save your changes back to the UAG.

21

Layer 2 Isolation

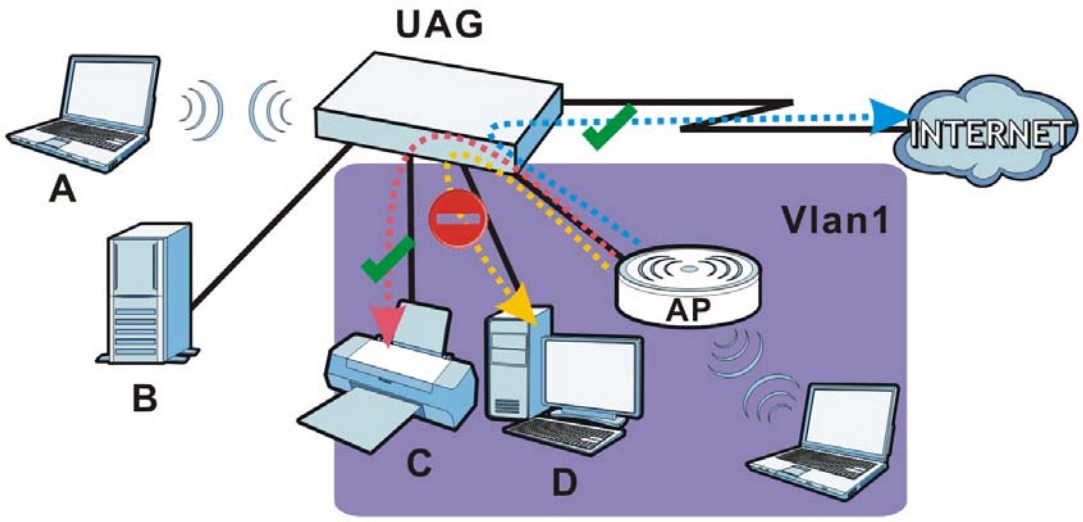
21.1 Overview

Layer-2 isolation is used to prevent connected devices from communicating with each other in the UAG's local network(s), on which layer-2 isolation is enabled, except the devices in the white list.

Note: Layer-2 isolation does not check the wireless traffic.

In the following example, layer-2 isolation is enabled on the UAG's interface Vlan1. A printer, PC and AP are in the Vlan1. The IP address of network printer (**C**) is added to the white list. The connected AP then cannot communicate with the PC (**D**), but can access the network printer (**C**), server (**B**), wireless client (**A**) and the Internet.

Figure 131 Layer-2 Isolation Application



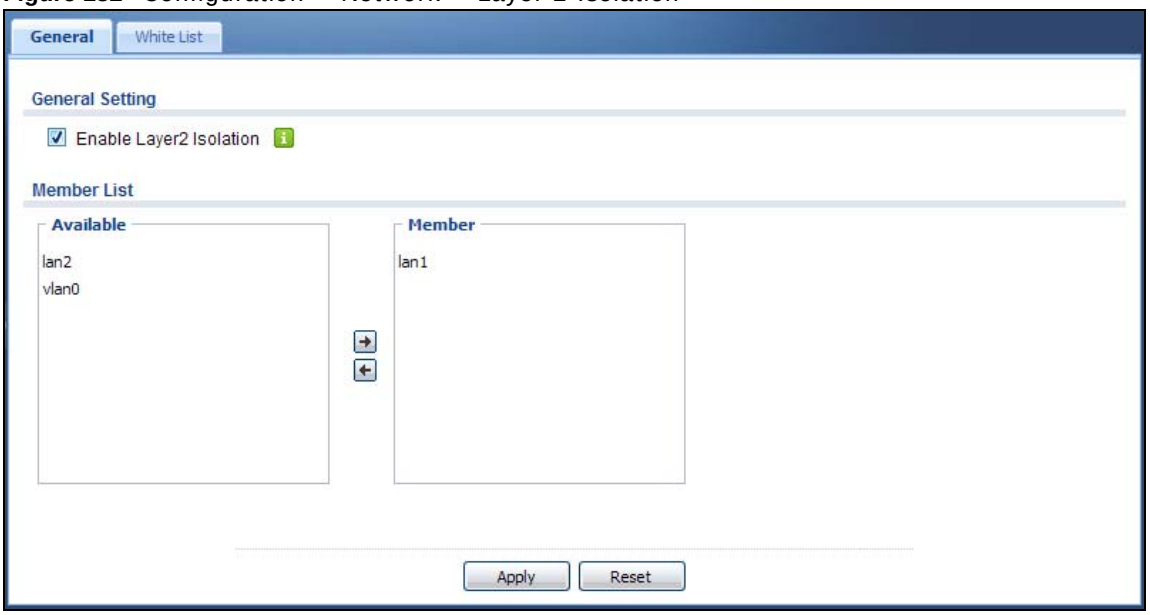
21.1.1 What You Can Do in this Chapter

- Use the **General** screen (Section 21.2 on page 199) to enable layer-2 isolation on the UAG and the internal interface(s).
- Use the **White List** screen (Section 21.3 on page 199) to enable and configures the white list.

21.2 Layer-2 Isolation General Screen

This screen allows you to enable Layer-2 isolation on the UAG and specific internal interface(s). To access this screen click **Configuration > Network > Layer 2 Isolation**.

Figure 132 Configuration > Network > Layer 2 Isolation



The following table describes the labels in this screen.

Table 97 Configuration > Network > Layer 2 Isolation

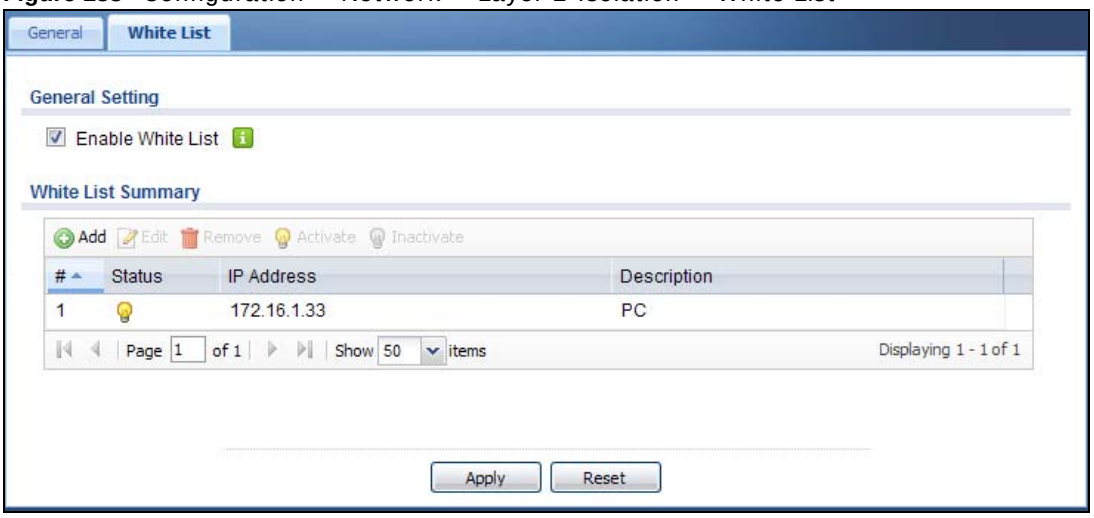
LABEL	DESCRIPTION
Enable Layer2 Isolation	Select this option to turn on the layer-2 isolation feature on the UAG. Note: You can enable this feature only when the firewall is enabled.
Member List	The **Available** list displays the name(s) of the internal interface(s) on which you can enable layer-2 isolation. To enable layer-2 isolation on an interface, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Member** list. To remove an interface, select the name(s) in the **Member** list and click the left arrow button.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

21.3 White List

IP addresses that are not listed in the white list are blocked from communicating with other devices in the layer-2-isolation-enabled internal interface(s) except for broadcast packets.

To access this screen click **Configuration > Network > Layer 2 Isolation > White List**.

Figure 133 Configuration > Network > Layer 2 Isolation > White List



The following table describes the labels in this screen.

Table 98 Configuration > Network > Layer 2 Isolation > White List

LABEL	DESCRIPTION
Enable White List	Select this option to turn on the white list on the UAG. Note: You can enable this feature only when the firewall is enabled.
Add	Click this to add a new rule.
Edit	Click this to edit the selected rule.
Remove	Click this to remove the selected rule.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific rule.
Status	This icon is lit when the rule is active and dimmed when the rule is inactive.
IP Address	This field displays the IP address of device that can be accessed by the devices connected to an internal interface on which layer-2 isolation is enabled.
Description	This field displays the description for the IP address in this rule.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

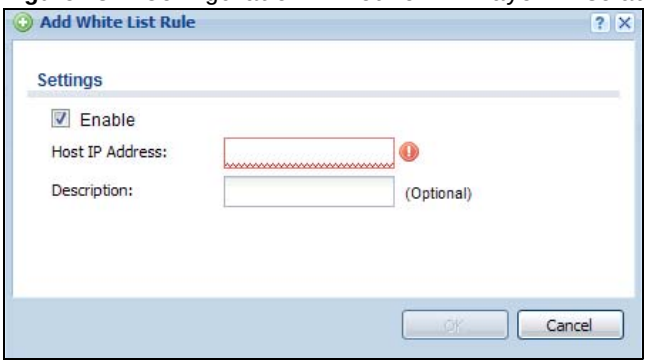
21.3.1 Add/Edit White List Rule

This screen allows you to create a new rule in the white list or edit an existing one. To access this screen, click the **Add** button or select an entry from the list and click the **Edit** button.

Note: You can configure up to 20 white list rules on the UAG.

Note: You need to know the IP address of each connected device that you want to allow to be accessed by other devices when layer-2 isolation is enabled.

Figure 134 Configuration > Network > Layer 2 Isolation > White List > Add/Edit



The following table describes the labels in this screen.

Table 99 Configuration > Network > Layer 2 Isolation > White List > Add/Edit

LABEL	DESCRIPTION
Enable	Select this option to turn on the rule.
Host IP Address	Enter an IPv4 address associated with this rule.
Description	Specify a description for the IP address associated with this rule. Enter up to 60 characters, spaces and underscores allowed.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

22

IPnP

22.1 Overview

IP Plug and Play (IPnP) allows a computer to access the Internet without changing the network settings (such as IP address and subnet mask) of the computer, even when the IP addresses of the computer and the UAG are not in the same subnet.

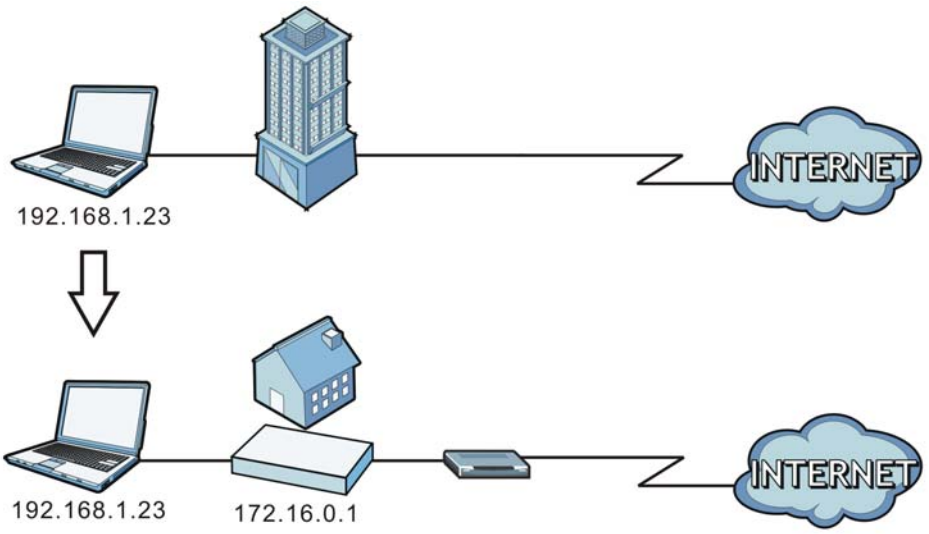
When you disable the IPnP feature, only computers with dynamic IP addresses or static IP addresses in the same subnet as the UAG's LAN IP address can connect to the UAG or access the Internet through the UAG.

The IPnP feature does not apply to a computer using either a dynamic IP address or a static IP address that is in the same subnet as the UAG's IP address.

Note: You must enable NAT to use the IPnP feature.

The following figure depicts a scenario where a computer is set to use a static private IP address in the corporate environment. In a residential house where a UAG is installed, you can still use the computer to access the Internet without changing the network settings, even when the IP addresses of the computer and the UAG are not in the same subnet.

Figure 135 IPnP Application



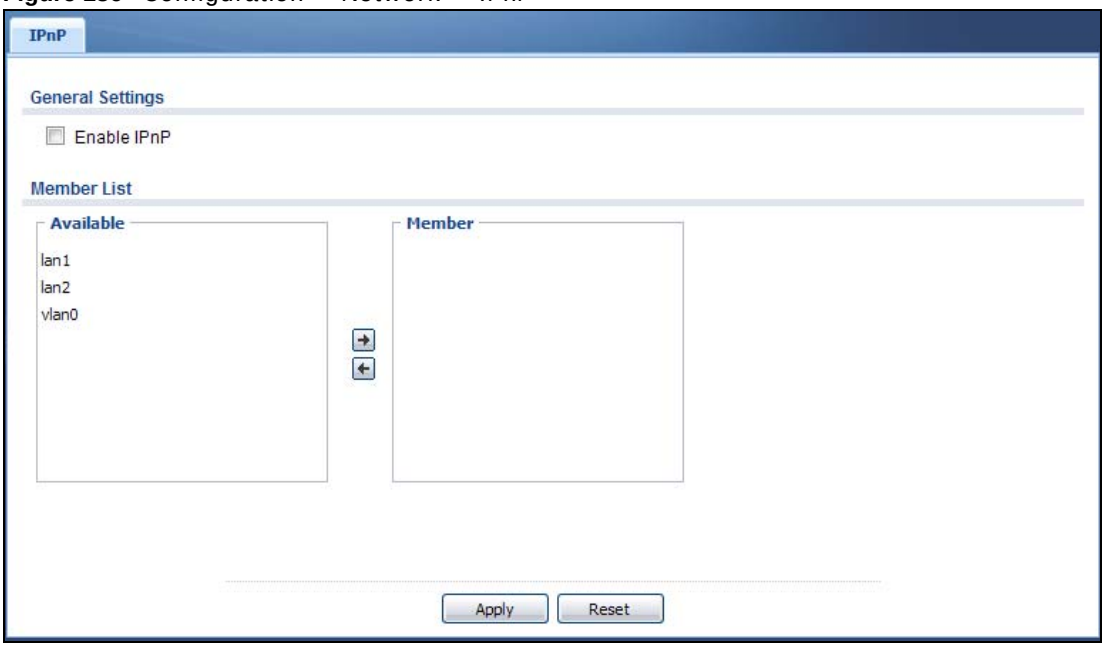
22.1.1 What You Can Do in this Chapter

Use the **IP** screen (Section 22.2 on page 203) to enable IPnP on the UAG and the internal interface(s).

22.2 IPnP Screen

This screen allows you to enable IPnP on the UAG and specific internal interface(s). To access this screen click **Configuration > Network > IPnP**.

Figure 136 Configuration > Network > IPnP



The following table describes the labels in this screen.

Table 100 Configuration > Network > IPnP

LABEL	DESCRIPTION
Enable IPnP	Select this option to turn on the IPnP feature on the UAG. Note: You can enable this feature only when the firewall is enabled.
Member List	The **Available** list displays the name(s) of the internal interface(s) on which you can enable IPnP. To enable IPnP on an interface, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Member** list. To remove an interface, select the name(s) in the **Member** list and click the left arrow button.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

23

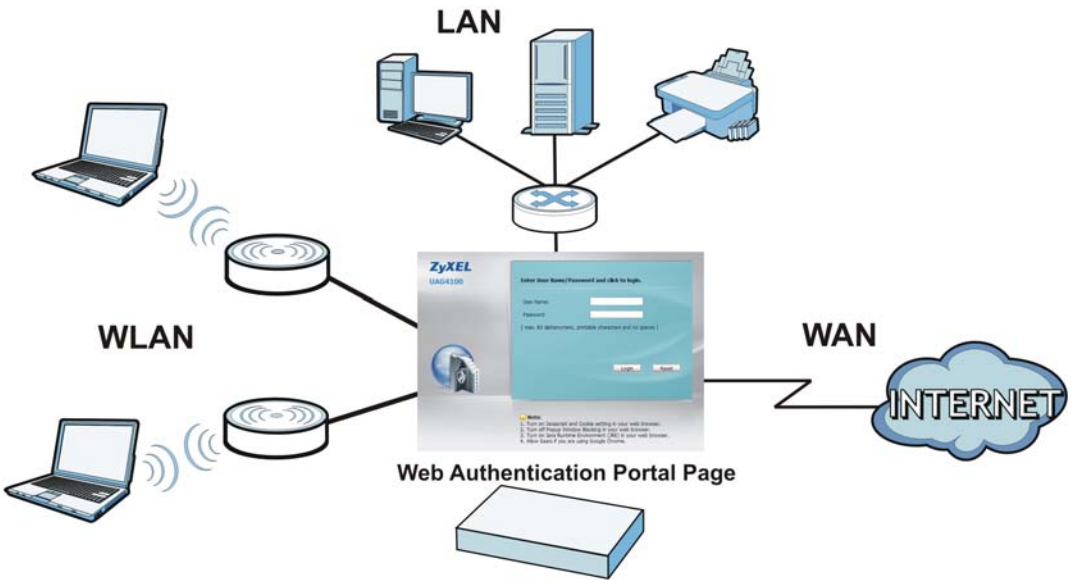
Web Authentication

23.1 Overview

Web authentication can intercepts network traffic, according to the authentication policies, until the user authenticates his or her connection, usually through a specifically designated login web page. This means all web page requests can initially be redirected to a special web page that requires users to authenticate their sessions. Once authentication is successful, they can then connect to the rest of the network or Internet.

As soon as a user attempt to open a web page, the UAG reroutes his/her browser to a web portal page that prompts he/she to log in.

Figure 137 Web Authentication Example



The web authentication page only appears once per authentication session. Unless a user session times out or he/she closes the connection, he or she generally will not see it again during the same session.

23.1.1 What You Can Do in this Chapter

- Use the **Configuration > Web Authentication** screens (Section 23.2 on page 205) to create and manage web authentication policies.
- Use the **Configuration > Web Authentication > Walled Garden** screens (Section 23.3 on page 218) to enable and create walled garden links that display in the login screen.
- Use the **Configuration > Web Authentication > Advertisement** screens (Section 23.4 on page 220) to enable and set advertisement links.

23.1.2 What You Need to Know

Forced User Authentication

Instead of making users for which user-aware policies have been configured go to the UAG **Login** screen manually, you can configure the UAG to display the **Login** screen automatically whenever it routes HTTP traffic for anyone who has not logged in yet.

Note: This works with HTTP traffic only. The UAG does not display the **Login** screen when users attempt to send other kinds of traffic.

The UAG does not automatically route the request that prompted the login, however, so users have to make this request again.

Finding Out More

See Section 23.2.2 on page 212 for an example of using an authentication policy for user-aware access control.

23.2 Web Authentication Screen

The **Web Authentication** screen displays the web portal settings and web authentication policies you have configured on the UAG. The screen differs depending on what you select in the **Authentication** field.

Click **Configuration > Web Authentication** to display the screen.

Figure 138 Configuration > Web Authentication (Web Portal)

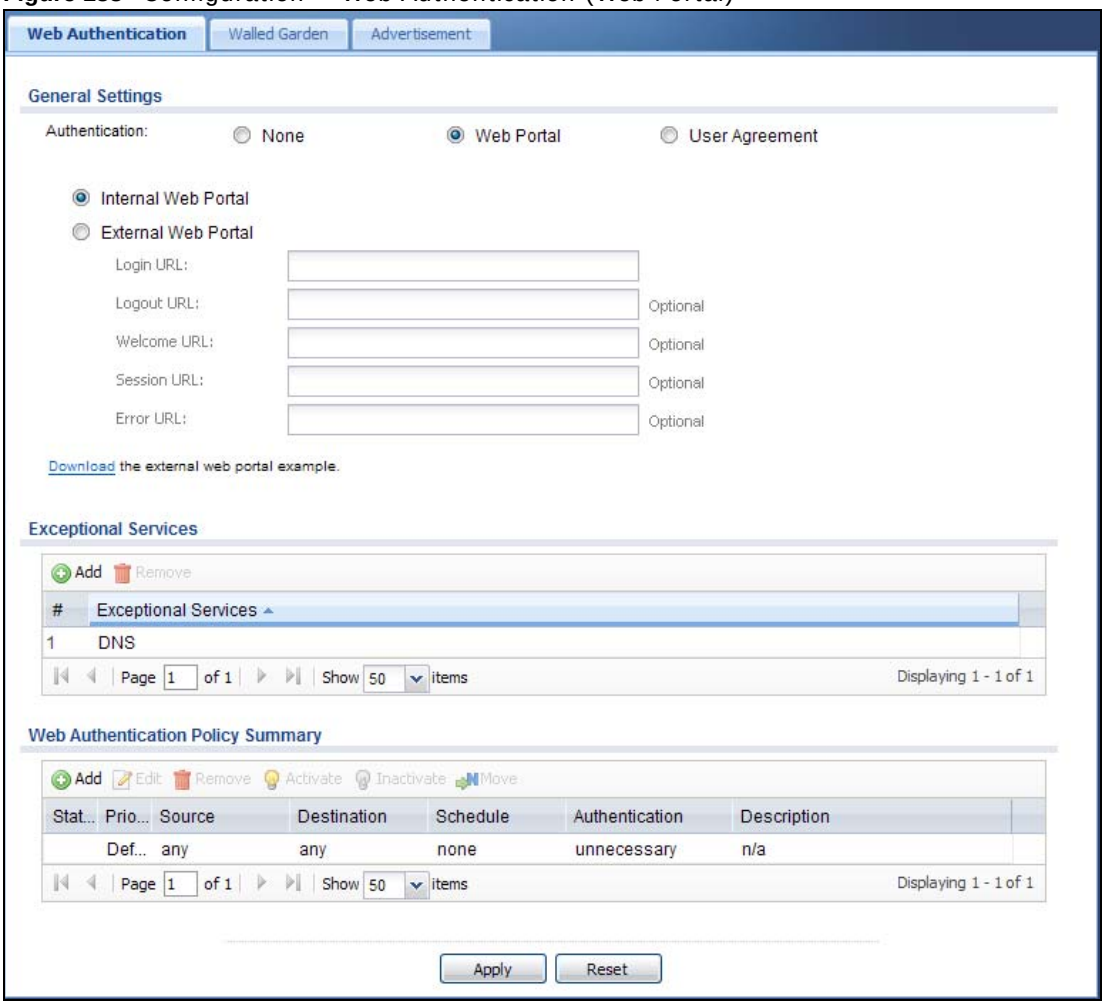
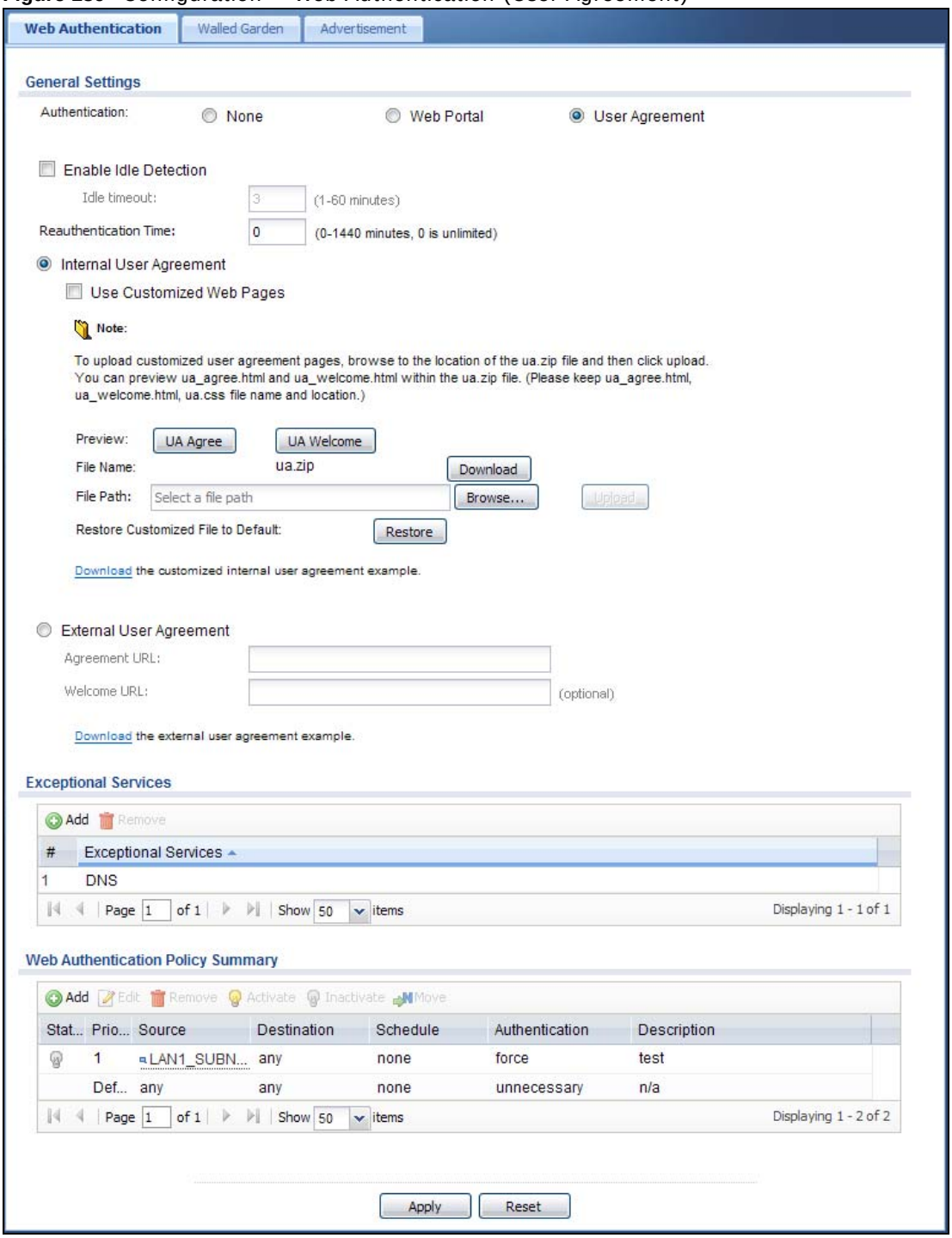


Figure 139 Configuration > Web Authentication (User Agreement)



The following table gives an overview of the objects you can configure.

Table 101 Configuration > Web Authentication

LABEL	DESCRIPTION
Authentication	Select **Web Portal** or **User Agreement** to turn on the web authentication feature. Otherwise, select **None** to turn it off. Once enabled, all network traffic is blocked until a client authenticates with the UAG through the specifically designated web portal or user agreement page. If you select **User agreement**, by agreeing to the policy of user agreement, users can access the Internet without a guest account.
The following fields are available if you set **Authentication** to **Web Portal**.	
Internal Web Portal	Select this to use the default login page built into the UAG. If you later assign a custom login page, you can still return to the UAG's default page as it is saved indefinitely. The login page appears whenever the web portal intercepts network traffic, preventing unauthorized users from gaining access to the network. You can customize the login page built into the UAG in the **System > WWW > Login Page** screen.
External Web Portal	Select this to use a custom login page from an external web portal instead of the default one built into the UAG. You can configure the look and feel of the web portal page.
Login URL	Specify the login page's URL; for example, http://IIS server IP Address/login.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Logout URL	Specify the logout page's URL; for example, http://IIS server IP Address/logout.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Welcome URL	Specify the welcome page's URL; for example, http://IIS server IP Address/welcome.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Session URL	Specify the session page's URL; for example, http://IIS server IP Address/session.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Error URL	Specify the error page's URL; for example, http://IIS server IP Address/error.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Download	Click this to download an example web portal file for your reference.
The following fields are available if you set **Authentication** to **User Agreement**.	
Enable Idle Detection	This is applicable for access users. Select this check box if you want the UAG to monitor how long each access user is logged in and idle (in other words, there is no traffic for this access user). The UAG automatically logs out the access user once the **Idle timeout** has been reached.
Idle timeout	This is applicable for access users. This field is effective when **Enable Idle Detection** is checked. Type the number of minutes each access user can be logged in and idle before the UAG automatically logs out the access user.
Reauthentication Time	Enter the number of minutes the user can be logged into the UAG in one session before having to log in again.

Table 101 Configuration > Web Authentication (continued)

LABEL	DESCRIPTION
Internal User Agreement	Select this to use the user agreement pages built into the UAG. The user agreement page appears whenever the UAG intercepts network traffic, preventing unauthorized users from gaining access to the network.
Use Customized Web Pages	Select this to use the custom user agreement pages that are uploaded to the UAG.
Preview	Click a button to display the corresponding page you uploaded to the UAG.
File Name	This shows the file name of the zipped user agreement file in the UAG. Click **Download** to download the user agreement file from the UAG to your computer.
File Path / Browse / Upload	Browse for the user agreement file or enter the file path in the available input box, then click the **Upload** button to put it on the UAG.
Restore customization file to default	Click **Restore** to set the UAG back to use the default built-in user agreement pages.
Download	Click this to download an example internal user agreement file from the UAG for your reference.
External User Agreement	Select this to use custom user agreement pages from an external web server instead of the default one built into the UAG. You can configure the look and feel of the user agreement page.
Agreement URL	Specify the user agreement page's URL; for example, http://IIS server IP Address/logout.html. The Internet Information Server (IIS) is the web server on which the user agreement files are installed.
Welcome URL	Specify the welcome page's URL; for example, http://IIS server IP Address/welcome.html. The Internet Information Server (IIS) is the web server on which the user agreement files are installed. If you leave this field blank, the UAG will use the welcome page of internal user agreement file.
Download	Click this to download an example external user agreement file for your reference.
The following fields are available if you set **Authentication** to **Web Portal** or **User Agreement**.	

Table 101 Configuration > Web Authentication (continued)

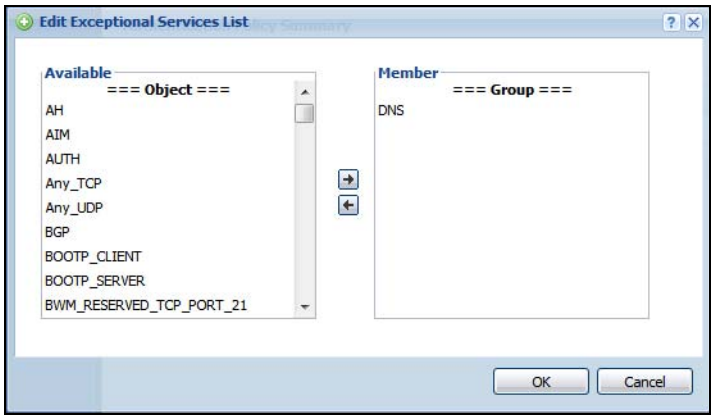
LABEL	DESCRIPTION
Exceptional Services	Use this table to list services that users can access without logging in. Click **Add** to change the list's membership. A screen appears. Available services appear on the left. Select any services you want users to be able to access without logging in and click the right arrow button to add them. The member services are on the right. Select any service that you want to remove from the member list, and click the left arrow button to remove them. Keeping DNS as a member allows users' computers to resolve domain names into IP addresses. **Figure 140** Configuration > Web Authentication > Add Exceptional Service  In the table, select one or more entries and click **Remove** to delete it or them.
Web Authentication Policy Summary	Use this table to manage the UAG's list of web authentication policies.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Priority	This is the position of the authentication policy in the list. The priority is important as the policies are applied in order of priority. **Default** displays for the default authentication policy that the UAG uses on traffic that does not match any exceptional service or other authentication policy. You can edit the default rule but not delete it.
Source	This displays the source address object to which this policy applies.
Destination	This displays the destination address object to which this policy applies.
Schedule	This field displays the schedule object that dictates when the policy applies. **none** means the policy is active at all times if enabled.

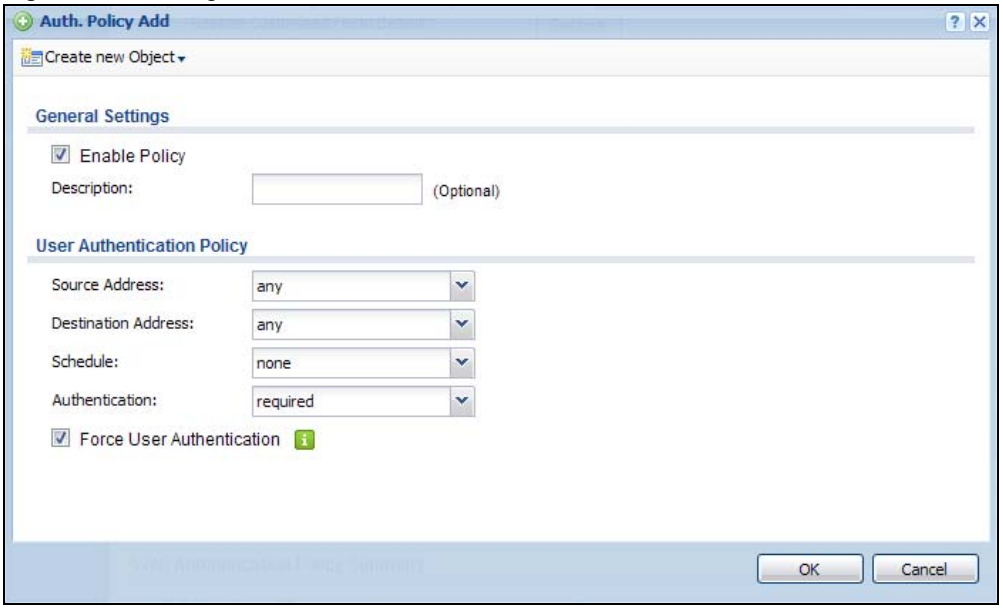
Table 101 Configuration > Web Authentication (continued)

LABEL	DESCRIPTION
Authentication	This field displays the authentication requirement for users when their traffic matches this policy. **unnecessary** - Users do not need to be authenticated. **required** - Users need to be authenticated. They must manually go to the login screen. The UAG will not redirect them to the login screen. **force** - Users need to be authenticated. The UAG automatically displays the login screen whenever it routes HTTP traffic for users who have not logged in yet.
Description	If the entry has a description configured, it displays here. This is **n/a** for the default policy.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

23.2.1 Creating/Editing an Authentication Policy

Click **Configuration > Web Authentication** and then the **Add** (or **Edit**) icon in the **Web Authentication Policy Summary** section to open the **Auth. Policy Add/Edit** screen. Use this screen to configure an authentication policy.

Figure 141 Configuration > Web Authentication > Add



The following table gives an overview of the objects you can configure.

Table 102 Configuration > Web Authentication > Add

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable Policy	Select this check box to activate the authentication policy. This field is available for user-configured policies.
Description	Enter a descriptive name of up to 60 printable ASCII characters for the policy. Spaces are allowed. This field is available for user-configured policies.

Table 102 Configuration > Web Authentication > Add (continued)

LABEL	DESCRIPTION
User Authentication Policy	Use this section of the screen to determine which traffic requires (or does not require) the senders to be authenticated in order to be routed.
Source Address	Select a source address or address group for whom this policy applies. Select **any** if the policy is effective for every source. This is **any** and not configurable for the default policy.
Destination Address	Select a destination address or address group for whom this policy applies. Select **any** if the policy is effective for every destination. This is **any** and not configurable for the default policy.
Schedule	Select a schedule that defines when the policy applies. Otherwise, select **none** and the rule is always effective. This is **none** and not configurable for the default policy.
Authentication	Select the authentication requirement for users when their traffic matches this policy. **unnecessary** - Users do not need to be authenticated. **required** - Users need to be authenticated. If **Force User Authentication** is selected, all HTTP traffic from unauthenticated users is redirected to a default or user-defined login page. Otherwise, they must manually go to the login screen. The UAG will not redirect them to the login screen.
Log	This field is available for the default policy. Select whether to have the UAG generate a log (**log**), log and alert (**log alert**) or not (**no**) for packets that match the default policy. See Chapter 40 on page 385 for more on logs.
Force User Authentication	This field is available for user-configured policies that require authentication. Select this to have the UAG automatically display the login screen when users who have not logged in yet try to send HTTP traffic.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

23.2.2 User-aware Access Control Example

You can configure many policies and security settings for specific users or groups of users. Users can be authenticated locally by the UAG or by an external (RADIUS) authentication server.

In this example the users are authenticated by an external RADIUS server at 172.16.1.200. First, set up the user accounts and user groups in the UAG. Then, set up user authentication using the RADIUS server. Finally, set up the policies in the table above.

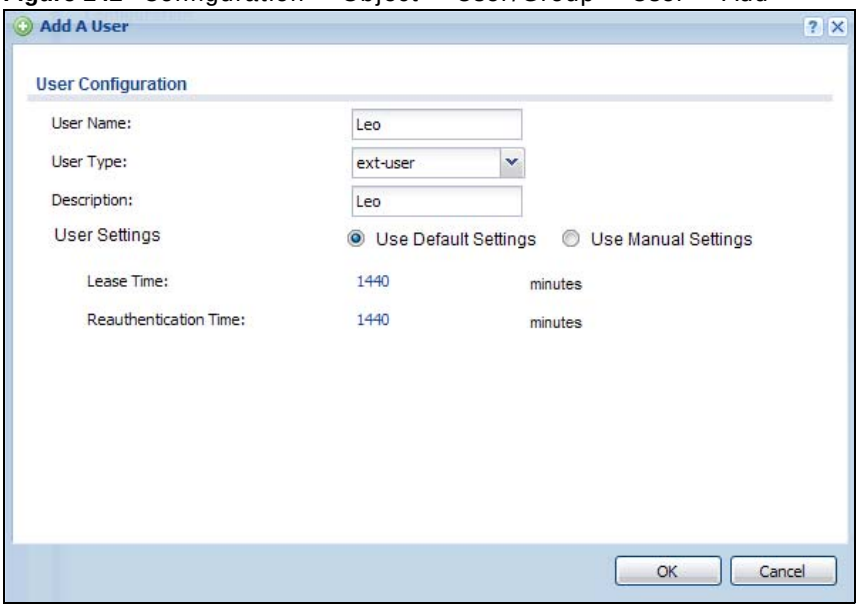
23.2.2.1 Set Up User Accounts

Set up user accounts in the RADIUS server. This example uses the Web Configurator. If you can export user names from the RADIUS server to a text file, then you might configure a script to create the user accounts instead.

1 Click **Configuration > Object > User/Group > User**. Click the **Add** icon.

2 Enter the same user name that is used in the RADIUS server, and set the **User Type** to **ext-user** because this user account is authenticated by an external server. Click **OK**.

Figure 142 Configuration > Object > User/Group > User > Add



3 Repeat this process to set up the remaining user accounts.

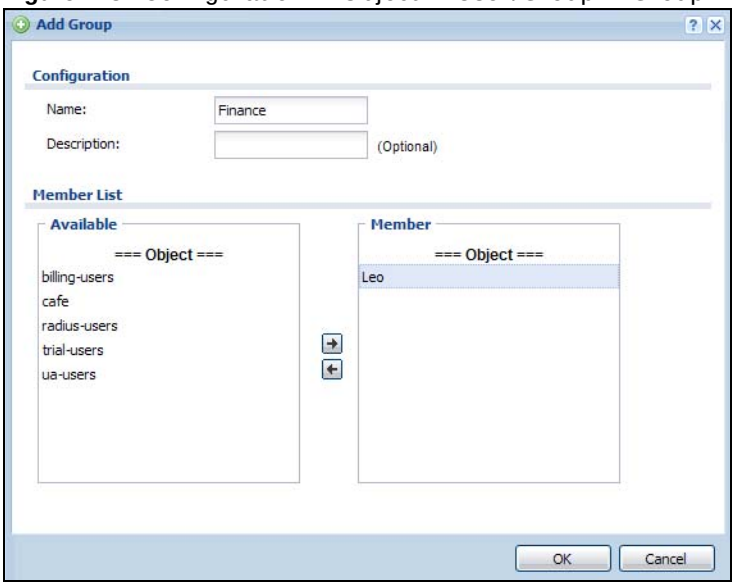
23.2.2.2 Set Up User Groups

Set up the user groups and assign the users to the user groups.

1 Click **Configuration > Object > User/Group > Group**. Click the **Add** icon.

2 Enter the name of the group. In this example, it is “Finance”. Then, select **Object/Leo** and click the right arrow to move him to the **Member** list. This example only has one member in this group, so click **OK**. Of course you could add more members later.

Figure 143 Configuration > Object > User/Group > Group > Add



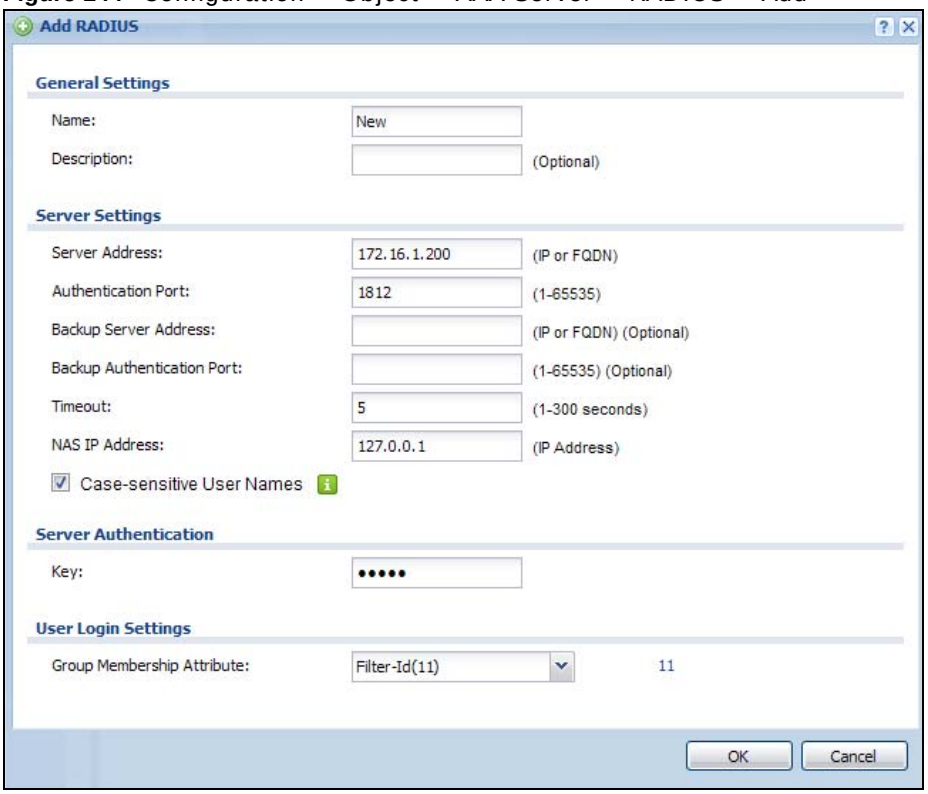
3 Repeat this process to set up the remaining user groups.

23.2.2.3 Set Up User Authentication Using the RADIUS Server

This step sets up user authentication using the RADIUS server. First, configure the settings for the RADIUS server. Then, set up the authentication method, and configure the UAG to use the authentication method. Finally, force users to log into the UAG before it routes traffic for them.

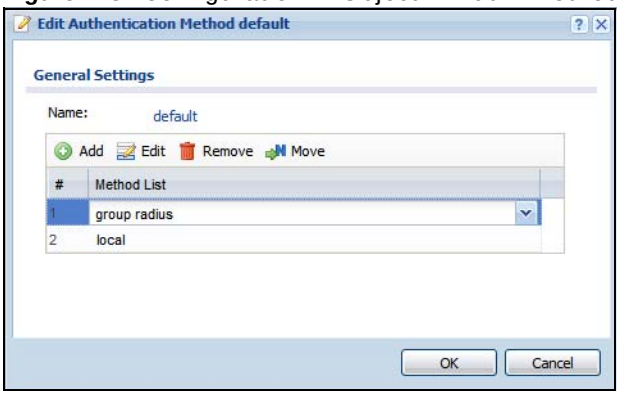
1 Click **Configuration > Object > AAA Server > RADIUS**. Double-click the **radius** entry. Configure the RADIUS server's address, authentication port (1812 if you were not told otherwise), and key. Click **Apply**.

Figure 144 Configuration > Object > AAA Server > RADIUS > Add



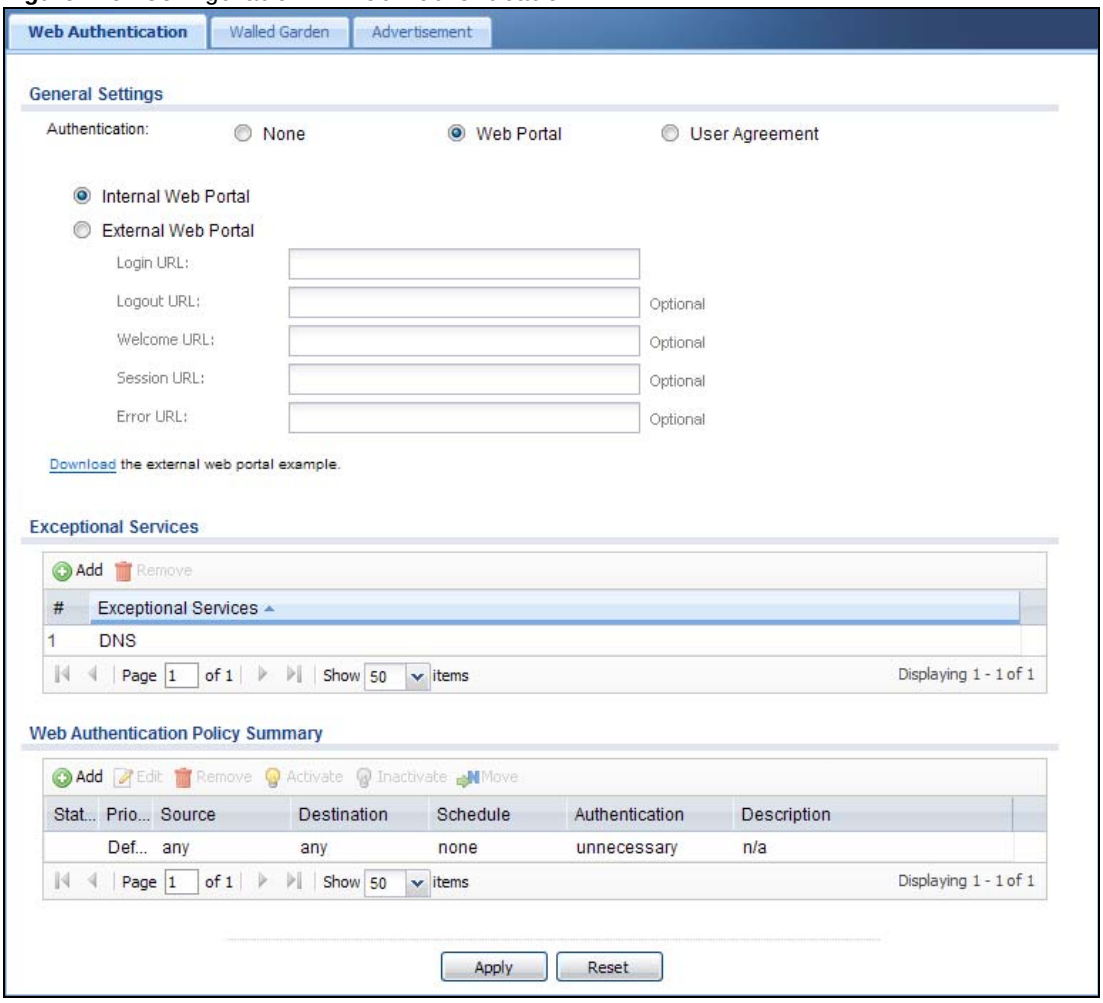
2 Click **Configuration > Object > Auth. Method**. Double-click the **default** entry. Click the **Add** icon. Select **group radius** because the UAG should use the specified RADIUS server for authentication. Click **OK**.

Figure 145 Configuration > Object > Auth. method > Edit



3 Click **Configuration > Web Authentication**. In the **Web Authentication** screen, select **Web Portal** to enable web authentication and click **Apply**.

Figure 146 Configuration > Web Authentication

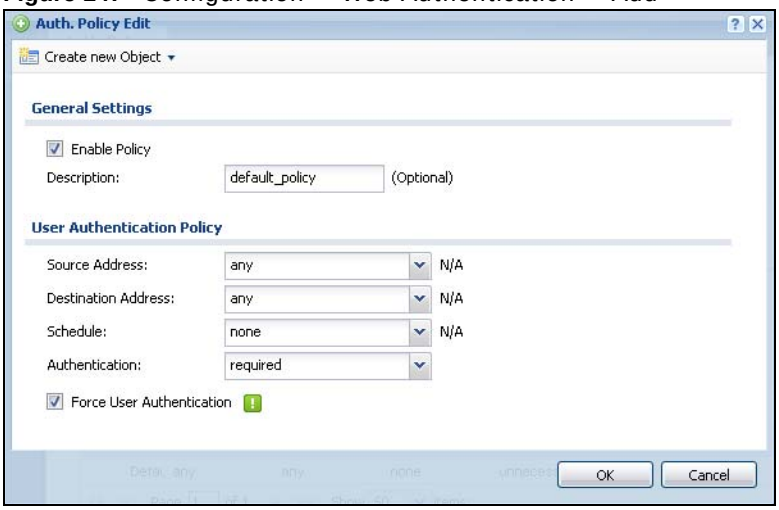


4 In the **Web Authentication Policy Summary** section, click the **Add** icon.

5 Set up a default policy that forces every user to log into the UAG before the UAG routes traffic for them. Select **Enable Policy**. Set the **Authentication** field to **required**, and make sure **Force User Authentication** is selected. Keep the rest of the default settings, and click **OK**.

Note: The users must log in at the Web Configurator login screen before they can use HTTP or MSN.

Figure 147 Configuration > Web Authentication > Add



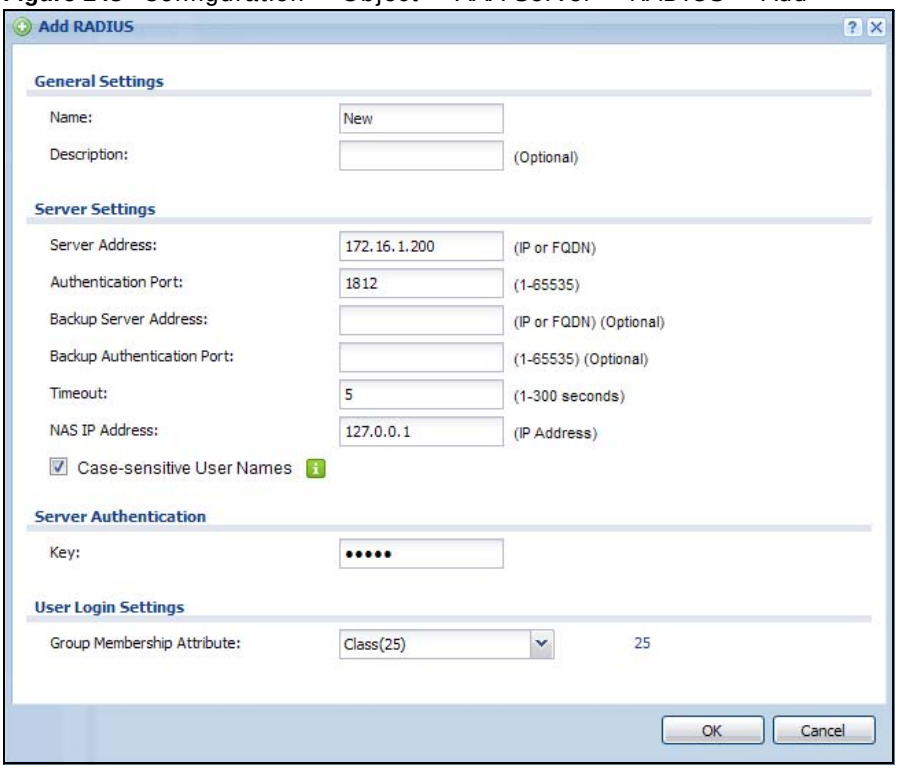
When the users try to browse the web (or use any HTTP/HTTPS application), the login screen appears. They have to log in using the user name and password in the RADIUS server.

23.2.2.4 User Group Authentication Using the RADIUS Server

The previous example showed how to have a RADIUS server authenticate individual user accounts. If the RADIUS server has different user groups distinguished by the value of a specific attribute, you can make a couple of slight changes in the configuration to have the RADIUS server authenticate groups of user accounts defined in the RADIUS server.

1 Click **Configuration > Object > AAA Server > RADIUS**. Double-click the **radius** entry. Besides configuring the RADIUS server's address, authentication port, and key; set the **Group Membership Attribute** field to the attribute that the UAG is to check to determine to which group a user belongs. This example uses **Class**. This attribute's value is called a group identifier; it determines to which group a user belongs. In this example the values are Finance, Engineer, Sales, and Boss.

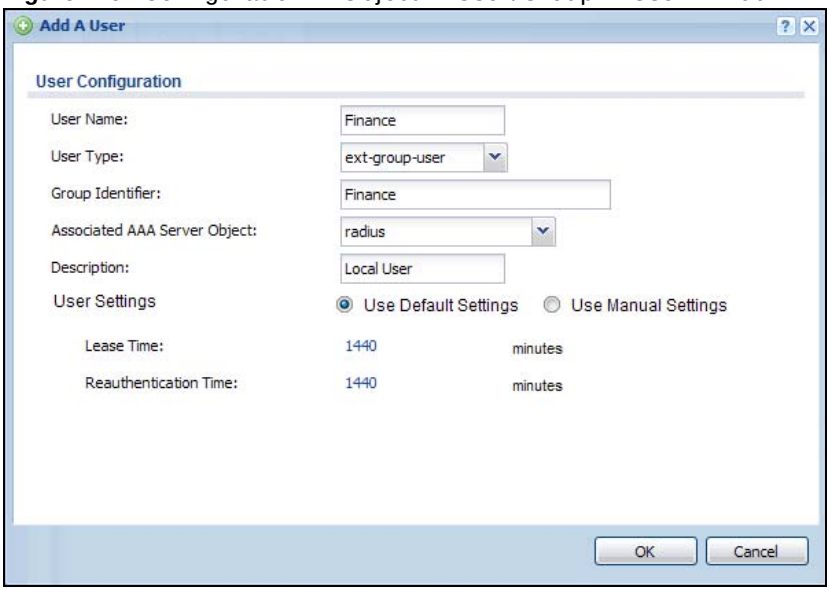
Figure 148 Configuration > Object > AAA Server > RADIUS > Add



2 Now you add ext-group-user user objects to identify groups based on the group identifier values. Set up one user account for each group of user accounts in the RADIUS server. Click **Configuration > Object > User/Group > User**. Click the **Add** icon.

Enter a user name and set the **User Type** to **ext-group-user**. In the **Group Identifier** field, enter Finance, Engineer, Sales, or Boss and set the **Associated AAA Server Object** to **radius**.

Figure 149 Configuration > Object > User/Group > User > Add



3 Repeat this process to set up the remaining groups of user accounts.

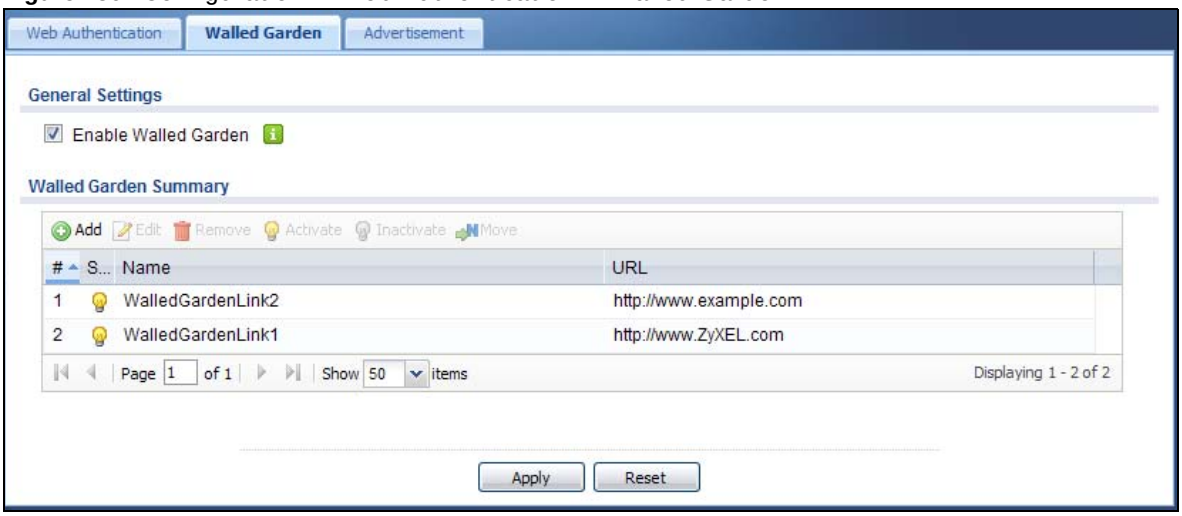
23.3 Walled Garden Screen

A user must log in before the UAG allows the user's access to the Internet. However, with a walled garden, you can define one or more web site addresses that all users can access without logging in. These can be used for advertisements for example.

Use this screen to configure walled garden web addresses for web sites that all users are allowed to access without logging in. The web site link(s) then displays in the user login screen.

Click **Configuration > Web Authentication > Walled Garden** to display the screen.

Figure 150 Configuration > Web Authentication > Walled Garden



The following table gives an overview of the objects you can configure.

Table 103 Configuration > Web Authentication > Walled Garden

LABEL	DESCRIPTION
Enable Walled Garden	Select this to turn on the walled garden feature. Note: This feature works only when you set web authentication to **Web Portal**.
Walled Garden Summary	Use this table to manage the list of walled garden links.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
#	This field is a sequential value, and it is not associated with any entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the descriptive name of web site.
URL	This field displays the address of web site.

Table 103 Configuration > Web Authentication > Walled Garden (continued)

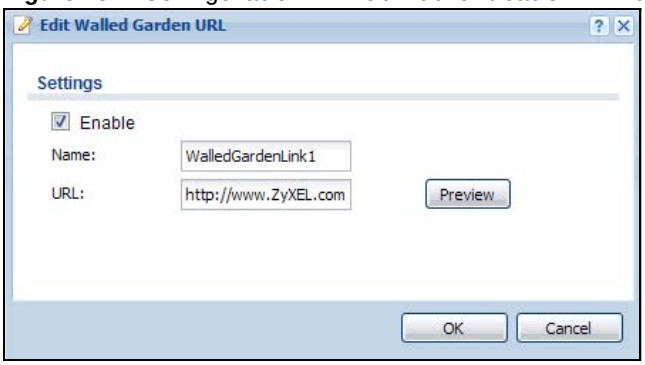
LABEL	DESCRIPTION
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

23.3.1 Adding/Editing a Walled Garden URL

Click **Configuration > Web Authentication** and then the **Add** (or **Edit**) icon in the **Walled Garden Summary** section to open the **Add/Edit Walled Garden URL** screen. Use this screen to configure a walled garden web site address entry.

Note: You can configure up to 20 walled garden URL links.

Figure 151 Configuration > Web Authentication > Walled Garden > Add/Edit



The following table gives an overview of the objects you can configure.

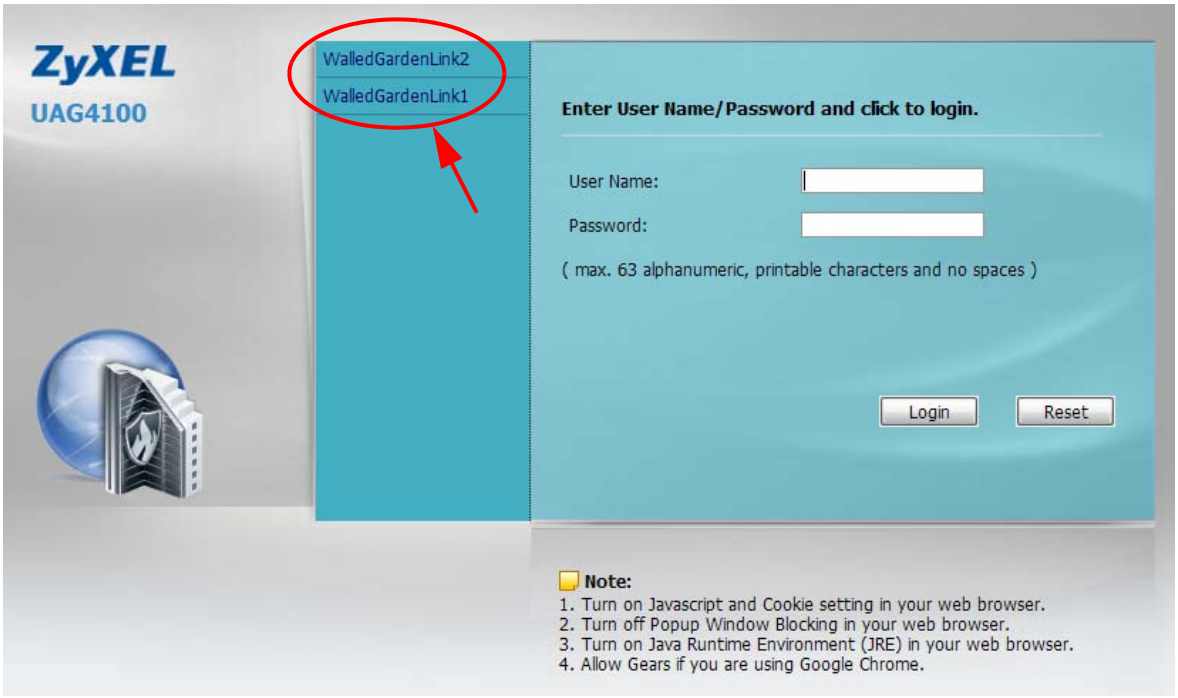
Table 104 Configuration > Web Authentication > Walled Garden > Add/Edit

LABEL	DESCRIPTION
Enable	Select this to activate the entry.
Name	Enter a descriptive name for the walled garden link to be displayed in the login screen. You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.
URL	Enter the URL or IP address of the web site. Use “http://” followed by up to 262 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%). For example, http://www.example.com or http://172.16.1.35.
Preview	Click this button to open the specified web site in a new frame.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

23.3.2 Walled Garden Login Example

The following figure shows the user login screen with two walled garden links. The links are named **WalledGardenLink1** through **2** for demonstration purposes.

Figure 152 Walled Garden Login Example

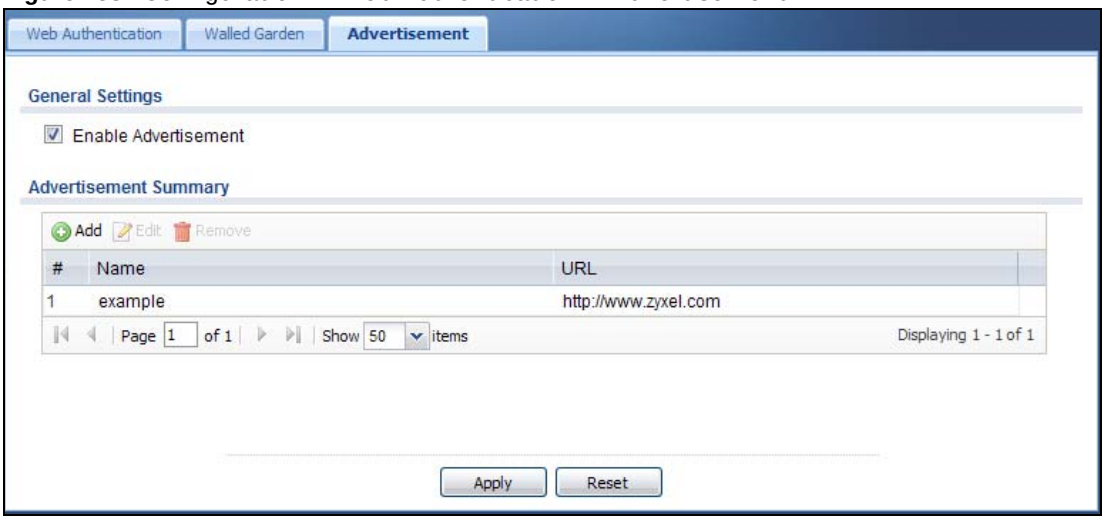


23.4 Advertisement Screen

Use this screen to set the UAG to display an advertisement web page as the first web page whenever the user connects to the Internet.

Click **Configuration > Web Authentication > Advertisement** to display the screen.

Figure 153 Configuration > Web Authentication > Advertisement



The following table gives an overview of the objects you can configure.

Table 105 Configuration > Web Authentication > Advertisement

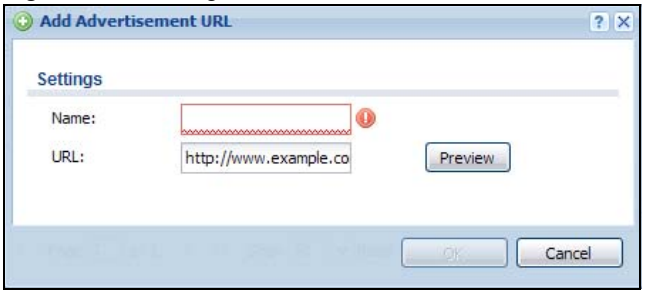
LABEL	DESCRIPTION
Enable Advertisement	Select this to turn on the advertisement feature. Note: This feature works only when you enable web authentication.
Advertisement Summary	Use this table to manage the list of advertisement web pages.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
#	This field is a sequential value, and it is not associated with any entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the descriptive name of web site.
URL	This field displays the address of web site.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

23.4.1 Adding/Editing an Advertisement URL

Click **Configuration > Web Authentication > Advertisement** and then the **Add** (or **Edit**) icon in the **Advertisement Summary** section to open the **Add/Edit Advertisement URL** screen. Use this screen to configure an advertisement address entry.

Note: You can create up to 20 advertisement URL entries. The UAG randomly picks one and open the specified web site in a new frame when an authenticated user is attempts to access the Internet.

Figure 154 Configuration > Web Authentication > Advertisement > Add/Edit



The following table gives an overview of the objects you can configure.

Table 106 Configuration > Web Authentication > Advertisement > Add/Edit

LABEL	DESCRIPTION
Enable	Select this to activate the entry.
Name	Enter a descriptive name for the advertisement web site. You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.
URL	Enter the URL or IP address of the web site. Use “http://” followed by up to 262 characters (0-9a-zA-Z;/?:@&=+$\.-_!~*'()%). For example, http://www.example.com or http://172.16.1.35.
Preview	Click this button to open the specified web site in a new frame.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

24

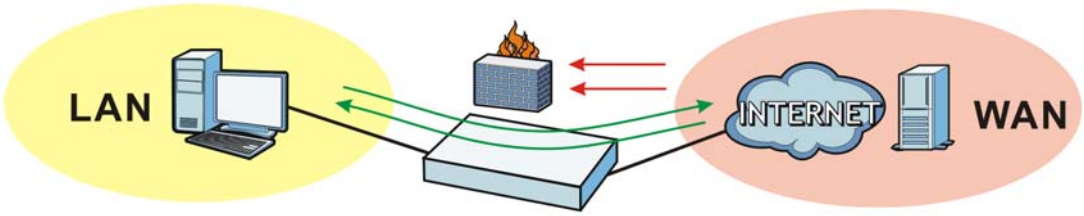
Firewall

24.1 Overview

Use the firewall to block or allow services that use static port numbers. The firewall can also limit the number of user sessions.

This example shows the UAG's default firewall behavior for WAN to LAN traffic and how stateful inspection works. A LAN user can initiate a Telnet session from within the LAN zone and the firewall allows the response. However, the firewall blocks Telnet traffic initiated from the WAN zone and destined for the LAN zone.

Figure 155 Default Firewall Action



24.1.1 What You Can Do in this Chapter

- Use the **Firewall** screens (Section 24.2 on page 225) to enable or disable the firewall and asymmetrical routes, and manage and configure firewall rules.
- Use the **Session Control** screens (see Section 24.3 on page 230) to limit the number of concurrent NAT/firewall sessions a client can use.

24.1.2 What You Need to Know

Stateful Inspection

The UAG has a stateful inspection firewall. The UAG restricts access by screening data packets against defined access rules. It also inspects sessions. For example, traffic from one zone is not allowed unless it is initiated by a computer in another zone first.

Zones

A zone is a group of interfaces. Group the UAG's interfaces into different zones based on your needs. You can configure firewall rules for data passing between zones or even between interfaces.

Default Firewall Behavior

Firewall rules are grouped based on the direction of travel of packets to which they apply. Here is the default firewall behavior for traffic going through the UAG in various directions.

Note: Intra-zone traffic (such as LAN to LAN traffic or WAN to WAN traffic) can also be blocked by the zone configuration. See Section 12.2.1 on page 157 for details.

Table 107 Default Firewall Behavior

FROM ZONE TO ZONE	BEHAVIOR
From any to Device	DHCP traffic from any interface to the UAG is allowed.
From LAN1 to any (other than the UAG)	Traffic from the LAN1 to any of the networks connected to the UAG is allowed.
From LAN2 to any (other than the UAG)	Traffic from the LAN2 to any of the networks connected to the UAG is allowed.
From LAN1 to Device	Traffic from the LAN1 to the UAG itself is allowed.
From LAN2 to Device	Traffic from the LAN2 to the UAG itself is allowed.
From WAN to Device	The default services listed in To-Device Rules on page 224 are allowed from the WAN to the UAG itself. All other WAN to UAG traffic is dropped.
From any to any	Traffic that does not match any firewall rule is dropped. This includes traffic from the WAN to any of the networks behind the UAG. This also includes traffic to or from interfaces that are not assigned to a zone (extra-zone traffic).

To-Device Rules

Rules with **Device** as the **To Zone** apply to traffic going to the UAG itself. By default:

- The firewall allows only LAN, or WAN computers to access or manage the UAG.
- The UAG allows DHCP traffic from any interface to the UAG.
- The UAG drops most packets from the WAN zone to the UAG itself and generates a log except for AH, ESP, GRE, HTTPS, IKE, NATT.

When you configure a firewall rule for packets destined for the UAG itself, make sure it does not conflict with your service control rule. See Chapter 39 on page 344 for more information about service control (remote management). The UAG checks the firewall rules before the service control rules for traffic destined for the UAG.

A **From Any To Device** direction rule applies to traffic from an interface which is not in a zone.

Global Firewall Rules

Firewall rules with **from any** and/or **to any** as the packet direction are called global firewall rules. The global firewall rules are the only firewall rules that apply to an interface that is not included in a zone. The **from any** rules apply to traffic coming from the interface and the **to any** rules apply to traffic going to the interface.

Firewall Rule Criteria

The UAG checks the schedule, user name (user's login name on the UAG), source IP address, destination IP address and IP protocol type of network traffic against the firewall rules (in the order you list them). When the traffic matches a rule, the UAG takes the action specified in the rule.

User Specific Firewall Rules

You can specify users or user groups in firewall rules. For example, to allow a specific user from any computer to access a zone by logging in to the UAG, you can set up a rule based on the user name only. If you also apply a schedule to the firewall rule, the user can only access the network at the scheduled time. A user-aware firewall rule is activated whenever the user logs in to the UAG and will be disabled after the user logs out of the UAG.

Session Limits

Accessing the UAG or network resources through the UAG requires a NAT session and corresponding firewall session. Peer to peer applications, such as file sharing applications, may use a large number of NAT sessions. A single client could use all of the available NAT sessions and prevent others from connecting to or through the UAG. The UAG lets you limit the number of concurrent NAT/firewall sessions a client can use.

Finding Out More

- See Section 24.4 on page 232 for an example of creating firewall rules as part of configuring user-aware access control.

24.2 The Firewall Screen

Asymmetrical Routes

If an alternate gateway on the LAN has an IP address in the same subnet as the UAG's LAN IP address, return traffic may not go through the UAG. This is called an asymmetrical or "triangle" route. This causes the UAG to reset the connection, as the connection has not been acknowledged.

You can have the UAG permit the use of asymmetrical route topology on the network (not reset the connection). However, allowing asymmetrical routes may let traffic from the WAN go directly to the LAN without passing through the UAG. A better solution is to use virtual interfaces to put the UAG and the backup gateway on separate subnets. Virtual interfaces allow you to partition your network into logical sections over the same interface. See the chapter about interfaces for more information.

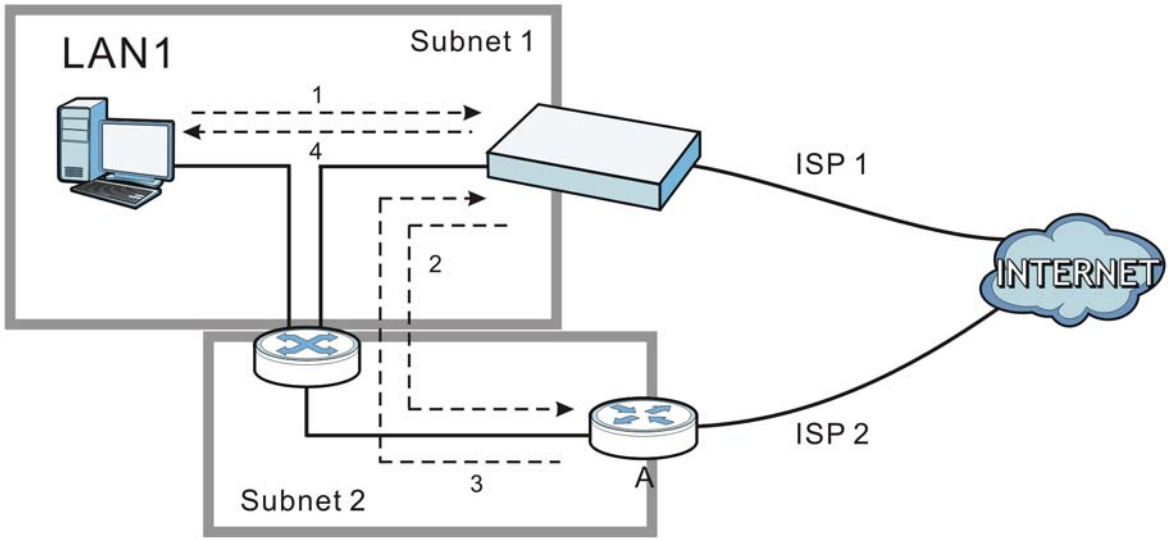
By putting LAN 1 and the alternate gateway (**A** in the figure) in different subnets, all returning network traffic must pass through the UAG to the LAN. The following steps and figure describe such a scenario.

1. A computer on the LAN1 initiates a connection by sending a SYN packet to a receiving server on the WAN.
2. The UAG reroutes the packet to gateway **A**, which is in **Subnet 2**.

3 The reply from the WAN goes to the UAG.

4 The UAG then sends it to the computer on the LAN1 in **Subnet 1**.

Figure 156 Using Virtual Interfaces to Avoid Asymmetrical Routes

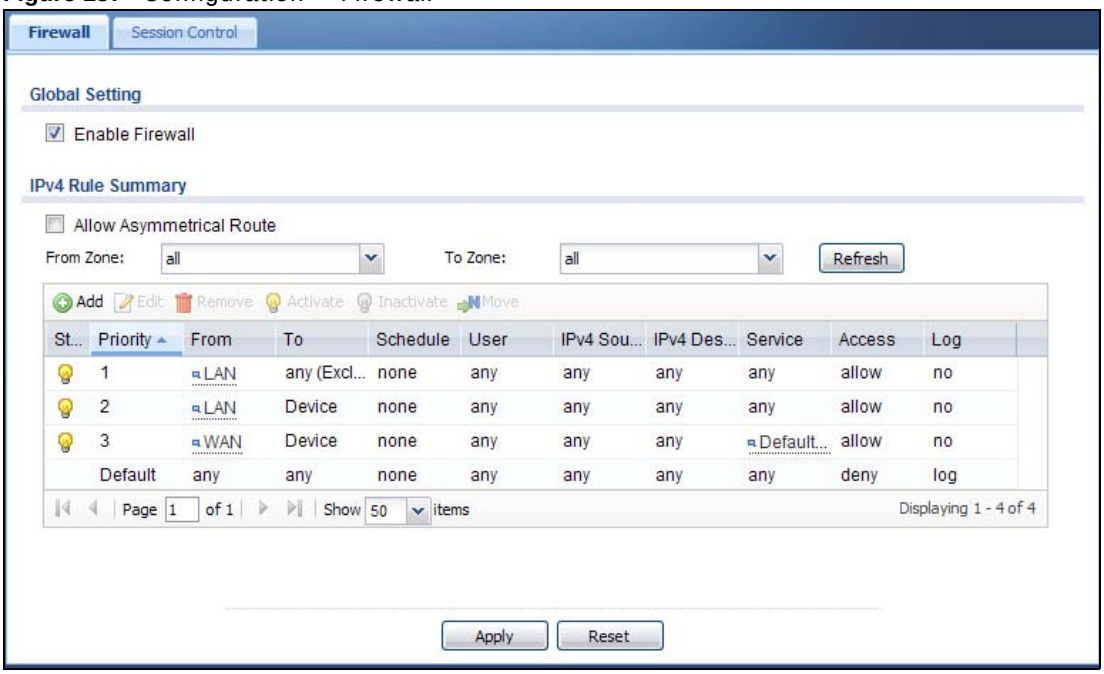


24.2.1 Configuring the Firewall Screen

Click **Configuration > Firewall** to open the **Firewall** screen. Use this screen to enable or disable the firewall and asymmetrical routes, set a maximum number of sessions per host, and display the configured firewall rules. Specify from which zone packets come and to which zone packets travel to display only the rules specific to the selected direction. Note the following.

- Besides configuring the firewall, you also need to configure NAT rules to allow computers on the WAN to access LAN devices. See Chapter 14 on page 164 for more information.
- The UAG applies NAT (Destination NAT) settings before applying the firewall rules. So for example, if you configure a NAT entry that sends WAN traffic to a LAN IP address, when you configure a corresponding firewall rule to allow the traffic, you need to set the LAN IP address as the destination.
- The ordering of your rules is very important as rules are applied in sequence.

Figure 157 Configuration > Firewall



The following table describes the labels in this screen.

Table 108 Configuration > Firewall

LABEL	DESCRIPTION
General Settings	
Enable Firewall	Select this check box to activate the firewall. The UAG performs access control when the firewall is activated.
IPv4 Rule Summary	
Allow Asymmetrical Route	If an alternate gateway on the LAN has an IP address in the same subnet as the UAG's LAN IP address, return traffic may not go through the UAG. This is called an asymmetrical or "triangle" route. This causes the UAG to reset the connection, as the connection has not been acknowledged. Select this check box to have the UAG permit the use of asymmetrical route topology on the network (not reset the connection). Note: Allowing asymmetrical routes may let traffic from the WAN go directly to the LAN without passing through the UAG. A better solution is to use virtual interfaces to put the UAG and the backup gateway on separate subnets.
From Zone / To Zone	This is the direction of travel of packets. Select from which zone the packets come and to which zone they go. Firewall rules are grouped based on the direction of travel of packets to which they apply. For example, from **LAN** to **LAN** means packets traveling from a computer or subnet on the LAN to either another computer or subnet on the LAN. From **any** displays all the firewall rules for traffic going to the selected **To Zone**. To **any** displays all the firewall rules for traffic coming from the selected **From Zone**. From **any** to **any** displays all of the firewall rules. To **Device** rules are for traffic that is destined for the UAG and control which computers can manage the UAG.

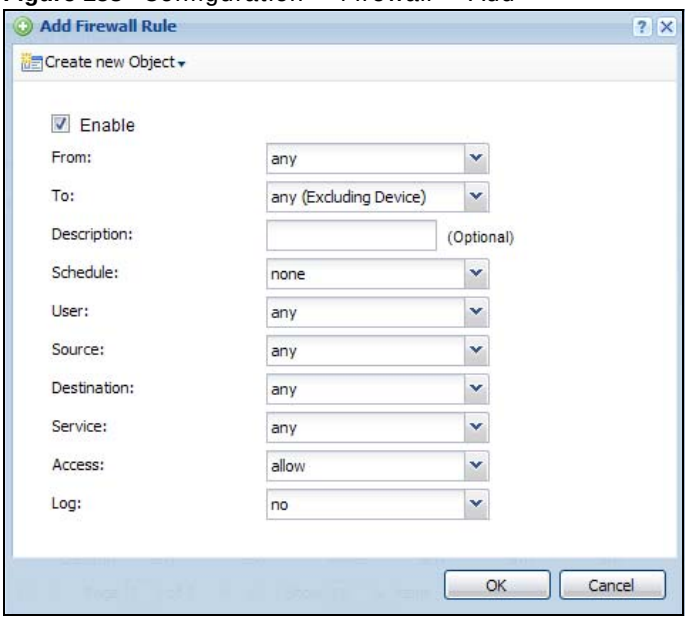
Table 108 Configuration > Firewall (continued)

LABEL	DESCRIPTION
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
The following read-only fields summarize the rules you have created that apply to traffic traveling in the selected packet direction.	
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Priority	This is the position of your firewall rule in the global rule list (including all through-UAG and to-UAG rules). The ordering of your rules is important as rules are applied in sequence. **Default** displays for the default firewall behavior that the UAG performs on traffic that does not match any other firewall rule.
From To	This is the direction of travel of packets to which the firewall rule applies.
Schedule	This field tells you the schedule object that the rule uses. **none** means the rule is active at all times if enabled.
User	This is the user name or user group name to which this firewall rule applies.
IPv4 Source	This displays the IPv4 source address object to which this firewall rule applies.
Destination	This displays the IPv4 destination address object to which this firewall rule applies.
Service	This displays the service object to which this firewall rule applies.
Access	This field displays whether the firewall silently discards packets (**deny**), discards packets and sends a TCP reset packet to the sender (**reject**) or permits the passage of packets (**allow**).
Log	This field shows you whether a log (and alert) is created when packets match this rule or not.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

24.2.2 The Firewall Add/Edit Screen

In the **Firewall** screen, click the **Edit** or **Add** icon to display the **Firewall Rule Edit** screen.

Figure 158 Configuration > Firewall > Add



The following table describes the labels in this screen.

Table 109 Configuration > Firewall > Add

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable	Select this check box to activate the firewall rule.
From To	For through-UAG rules, select the direction of travel of packets to which the rule applies. **any** means all interfaces. **Device** means packets destined for the UAG itself.
Description	Enter a descriptive name of up to 60 printable ASCII characters for the firewall rule. Spaces are allowed.
Schedule	Select a schedule that defines when the rule applies. Otherwise, select **none** and the rule is always effective.
User	This field is not available when you are configuring a to-UAG rule. Select a user name or user group to which to apply the rule. The firewall rule is activated only when the specified user logs into the system and the rule will be disabled when the user logs out. Otherwise, select **any** and there is no need for user logging. Note: If you specified a source IP address (group) instead of **any** in the field below, the user's IP address should be within the IP address range.
Source	Select an IPv4 address or address group to apply an IPv4 rule to traffic coming from it. Select **any** to apply an IPv4 rule to all traffic coming from IPv4 addresses.
Destination	Select an IPv4 address or address group to apply an IPv4 rule to traffic going to it. Select **any** to apply an IPv4 rule to all traffic going to IPv4 addresses.
Service	Select a service or service group from the drop-down list box.

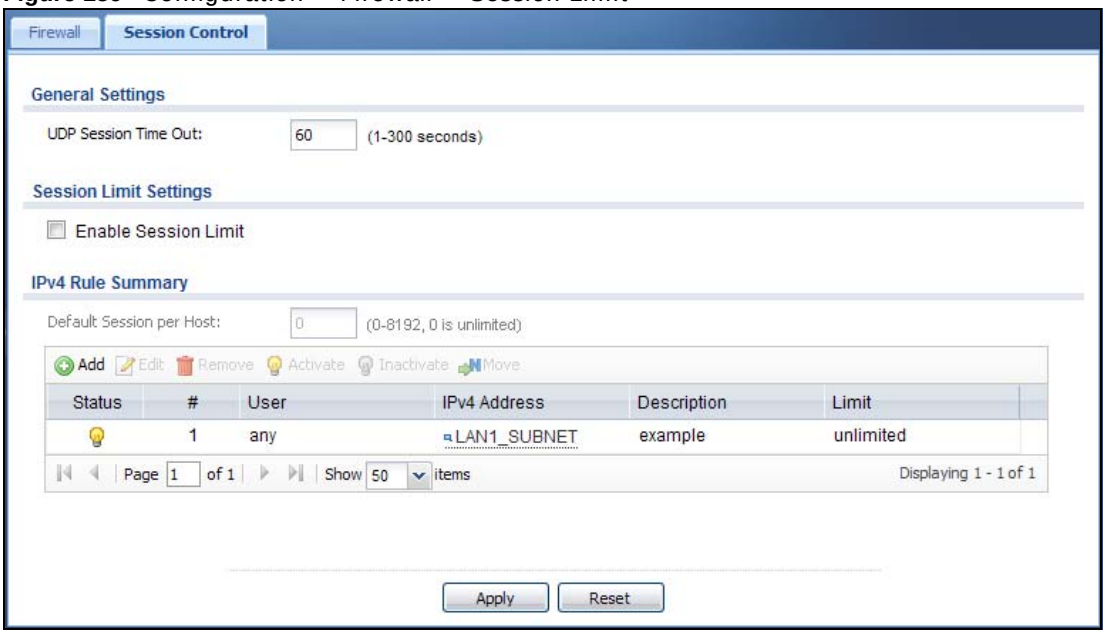
Table 109 Configuration > Firewall > Add (continued)

LABEL	DESCRIPTION
Access	Use the drop-down list box to select what the firewall is to do with packets that match this rule. Select **deny** to silently discard the packets without sending a TCP reset packet or an ICMP destination-unreachable message to the sender. Select **reject** to deny the packets and send a TCP reset packet to the sender. Any UDP packets are dropped without sending a response packet. Select **allow** to permit the passage of the packets.
Log	Select whether to have the UAG generate a log (**log**), log and alert (**log alert**) or not (**no**) when the rule is matched. See Chapter 40 on page 385 for more on logs.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

24.3 The Session Control Screen

Click **Configuration > Firewall > Session Control** to display the **Firewall Session Control** screen. Use this screen to limit the number of concurrent NAT/firewall sessions a client can use. You can apply a default limit for all users and individual limits for specific users, addresses, or both. The individual limit takes priority if you apply both.

Figure 159 Configuration > Firewall > Session Limit



The following table describes the labels in this screen.

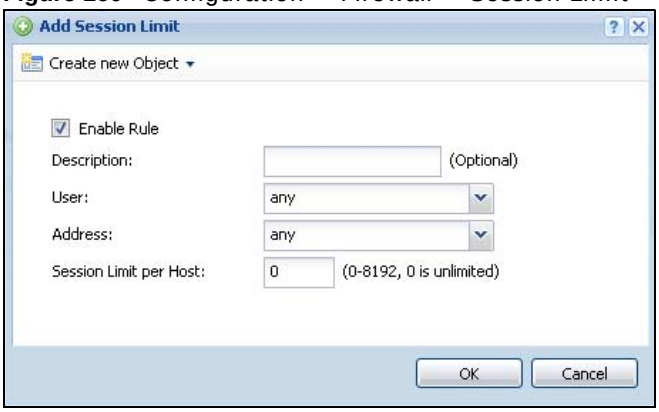
Table 110 Configuration > Firewall > Session Limit

LABEL	DESCRIPTION
General Settings	
UDP Session Time Out	Set how many seconds (from 1 to 300) the UAG will allow a UDP session to remain idle (without UDP traffic) before closing it.
Session Limit Settings	
Enable Session limit	Select this check box to control the number of concurrent sessions hosts can have.
IPv4 Rule Summary	This table lists the rules for limiting the number of concurrent sessions hosts can have.
Default Session per Host	This field is configurable only when you enable session limit. Use this field to set a common limit to the number of concurrent NAT/firewall sessions each client computer can have. If only a few clients use peer to peer applications, you can raise this number to improve their performance. With heavy peer to peer application use, lower this number to ensure no single client uses too many of the available NAT sessions. Create rules below to apply other limits for specific users or addresses.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
#	This is the index number of a session limit rule. It is not associated with a specific rule.
User	This is the user name or user group name to which this session limit rule applies.
IPv4 Address	This is the IPv4 address object to which this session limit rule applies.
Description	This is the information configured to help you identify the rule.
Limit	This is how many concurrent sessions this user or address is allowed to have.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

24.3.1 The Session Limit Add/Edit Screen

Click **Configuration > Firewall > Session Limit** and the **Add** or **Edit** icon to display the **Firewall Session Limit Edit** screen. Use this screen to configure rules that define a session limit for specific users or addresses.

Figure 160 Configuration > Firewall > Session Limit > Edit



The following table describes the labels in this screen.

Table 111 Configuration > Firewall > Session Limit > Edit

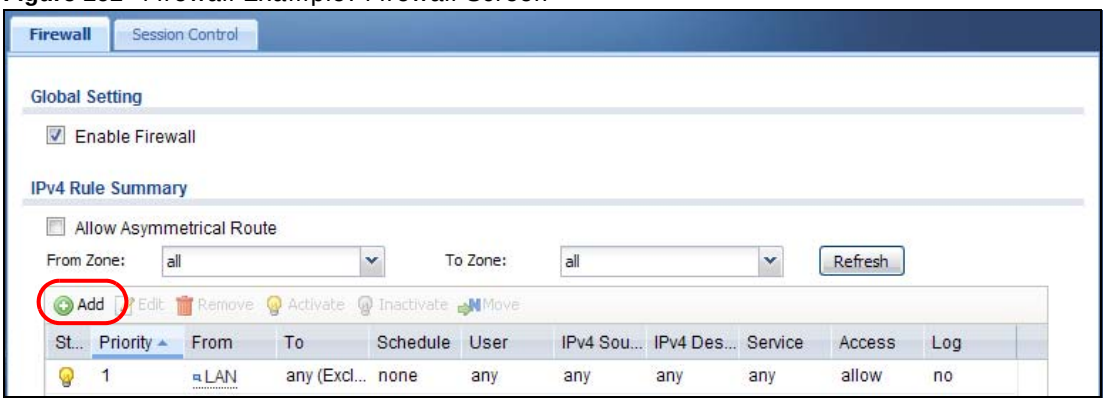
LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable Rule	Select this check box to turn on this session limit rule.
Description	Enter information to help you identify this rule. Use up to 60 printable ASCII characters. Spaces are allowed.
User	Select a user name or user group to which to apply the rule. The rule is activated only when the specified user logs into the system and the rule will be disabled when the user logs out. Otherwise, select **any** and there is no need for user logging. Note: If you specified an IP address (or address group) instead of **any** in the field below, the user's IP address should be within the IP address range.
Address	Select the IPv4 source address or address group to which this rule applies. Select **any** to apply the rule to all IPv4 source addresses.
Session Limit per Host	Use this field to set a limit to the number of concurrent NAT/firewall sessions this rule's users or addresses can have. For this rule's users and addresses, this setting overrides the **Default Session per Host** setting in the general **Firewall Session Control** screen.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

24.4 Firewall Rule Configuration Example

The following Internet firewall rule example allows Doom players from the WAN to IP addresses 172.16.1.10 through 172.16.1.15 (Dest_1) on the LAN.

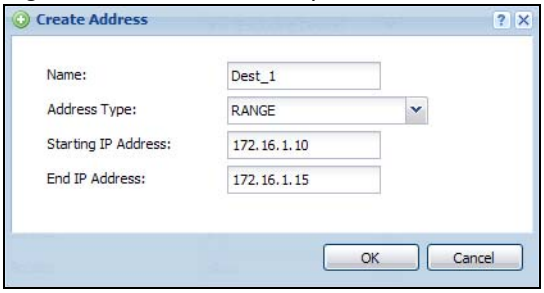
1 Click **Configuration > Firewall**. In the summary of firewall rules click **Add** to configure a new first entry. The sequence (priority) of the rules is important since they are applied in order.

Figure 161 Firewall Example: Firewall Screen



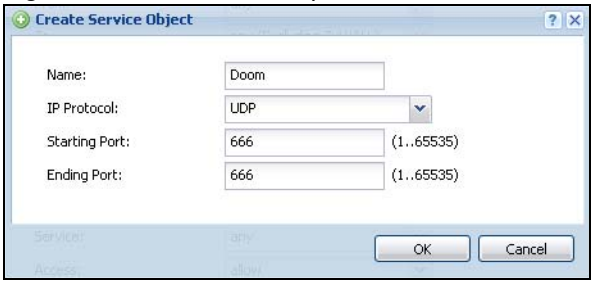
2 At the top of the screen, click **Create new Object > Address** to configure an address object. Configure it as follows and click **OK**.

Figure 162 Firewall Example: Create an Address Object



3 Click **Create new Object > Service** to configure a service object for Doom (UDP port 666). Configure it as follows and click **OK**.

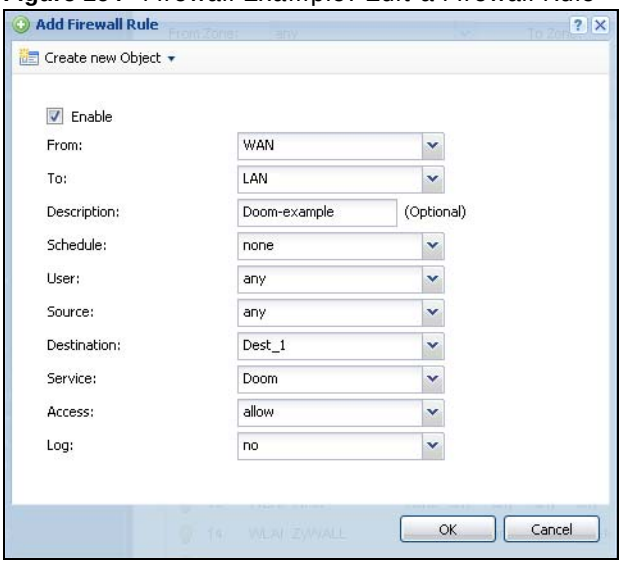
Figure 163 Firewall Example: Create a Service Object



4 Select **From WAN** and **To LAN** and enter a name for the firewall rule.

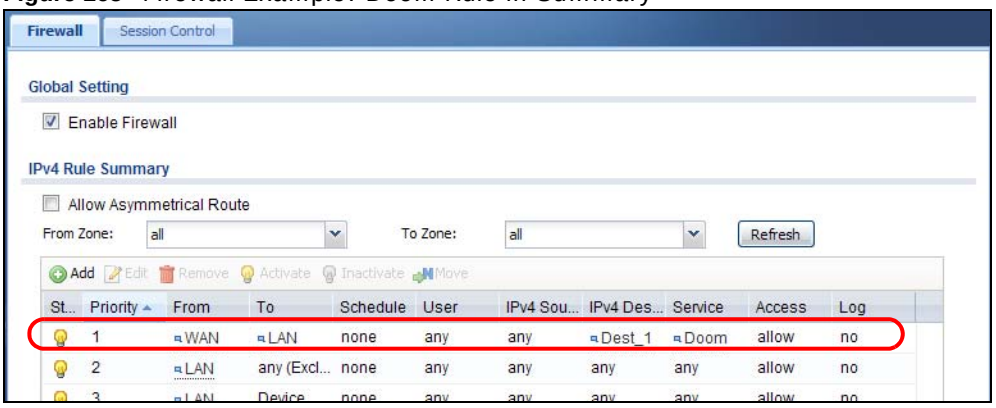
Select **Dest_1** for the **Destination** and **Doom** as the **Service**. Enter a description and configure the rest of the screen as follows. Click **OK** when you are done.

Figure 164 Firewall Example: Edit a Firewall Rule



5 The firewall rule appears in the firewall rule summary.

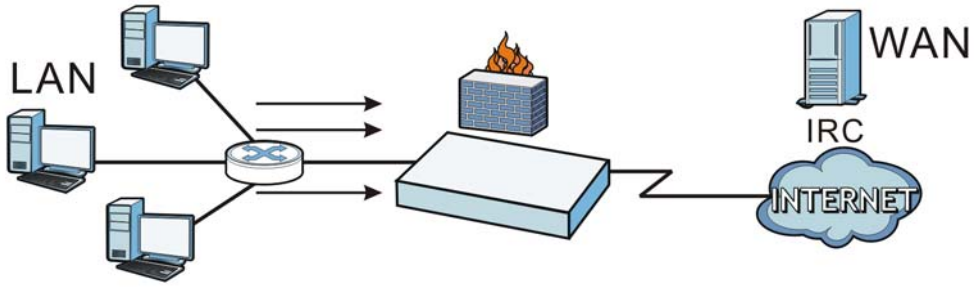
Figure 165 Firewall Example: Doom Rule in Summary



24.5 Firewall Rule Example Applications

Suppose you decide to block LAN users from using IRC (Internet Relay Chat) through the Internet. To do this, you would configure a LAN to WAN firewall rule that blocks IRC traffic from any source IP address from going to any destination address. You do not need to specify a schedule since you need the firewall rule to always be in effect. The following figure shows the results of this rule.

Figure 166 Blocking All LAN to WAN IRC Traffic Example



Your firewall would have the following rules.

Table 112 Blocking All LAN to WAN IRC Traffic Example

#	USER	SOURCE	DESTINATION	SCHEDULE	SERVICE	ACTION
1	Any	Any	Any	Any	IRC	Deny
2	Any	Any	Any	Any	Any	Allow

- The first row blocks LAN access to the IRC service on the WAN.
- The second row is the firewall's default policy that allows all LAN1 to WAN traffic.

The UAG applies the firewall rules in order. So for this example, when the UAG receives traffic from the LAN, it checks it against the first rule. If the traffic matches (if it is IRC traffic) the firewall takes the action in the rule (drop) and stops checking the firewall rules. Any traffic that does not match the first firewall rule will match the second rule and the UAG forwards it.

Now suppose you need to let the CEO use IRC. You configure a LAN1 to WAN firewall rule that allows IRC traffic from the IP address of the CEO's computer. You can also configure a LAN to WAN rule that allows IRC traffic from any computer through which the CEO logs into the UAG with his/her user name. In order to make sure that the CEO's computer always uses the same IP address, make sure it either:

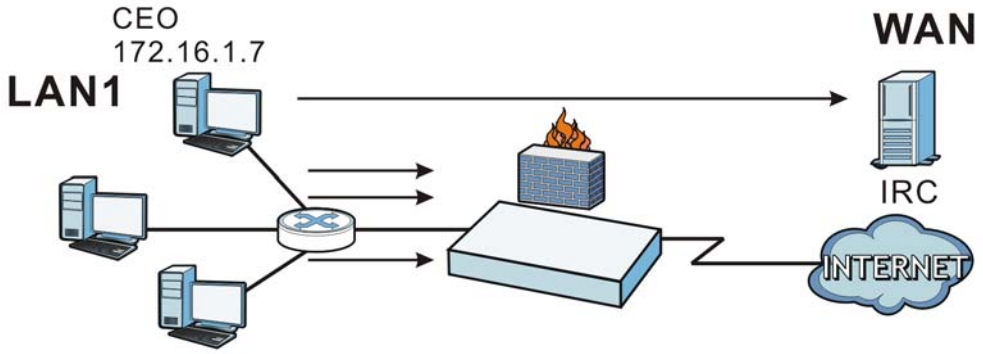
- Has a static IP address,

  or

- You configure a static DHCP entry for it so the UAG always assigns it the same IP address (see DHCP Settings on page 134 for information on DHCP).

Now you configure a LAN1 to WAN firewall rule that allows IRC traffic from the IP address of the CEO's computer (172.16.1.7 for example) to go to any destination address. You do not need to specify a schedule since you want the firewall rule to always be in effect. The following figure shows the results of your two custom rules.

Figure 167 Limited LAN to WAN IRC Traffic Example



Your firewall would have the following configuration.

Table 113 Limited LAN1 to WAN IRC Traffic Example 1

#	USER	SOURCE	DESTINATION	SCHEDULE	SERVICE	ACTION
1	Any	172.16.1.7	Any	Any	IRC	Allow
2	Any	Any	Any	Any	IRC	Deny
3	Any	Any	Any	Any	Any	Allow

- The first row allows the LAN1 computer at IP address 172.16.1.7 to access the IRC service on the WAN.
- The second row blocks LAN1 access to the IRC service on the WAN.
- The third row is the firewall's default policy of allowing all traffic from the LAN1 to go to the WAN.

Alternatively, you configure a LAN1 to WAN rule with the CEO's user name (say CEO) to allow IRC traffic from any source IP address to go to any destination address.

Your firewall would have the following configuration.

Table 114 Limited LAN1 to WAN IRC Traffic Example 2

#	USER	SOURCE	DESTINATION	SCHEDULE	SERVICE	ACTION
1	CEO	Any	Any	Any	IRC	Allow
2	Any	Any	Any	Any	IRC	Deny
3	Any	Any	Any	Any	Any	Allow

- The first row allows any LAN1 computer to access the IRC service on the WAN by logging into the UAG with the CEO's user name.
- The second row blocks LAN1 access to the IRC service on the WAN.
- The third row is the firewall's default policy of allowing all traffic from the LAN1 to go to the WAN.

The rule for the CEO must come before the rule that blocks all LAN1 to WAN IRC traffic. If the rule that blocks all LAN1 to WAN IRC traffic came first, the CEO's IRC traffic would match that rule and the UAG would drop it and not check any other firewall rules.

25

Billing

25.1 Overview

You can use the built-in billing function to setup billing profiles. A billing profile describes how to charge users. This chapter also shows you how to select an accounting method, configure a discount price plan or use an online payment service by credit card.

25.1.1 What You Can Do in this Chapter

- Use the **General** screen (see Section 25.2 on page 238) to configure the general billing settings, such as the accounting method, currency unit and the SSID profiles to which the settings are applied.
- Use the **Billing Profile** screen (see Section 25.3 on page 239) to configure the billing profiles for the web-based account generator and each button on the connected statement printer.
- Use the **Discount** screen (see Section 25.4 on page 245) to enable and configure discount price plans.
- Use the **Payment Service** screen (see Section 25.5 on page 247) to enable online payment service and configure the service pages.

25.1.2 What You Need to Know

Accumulation Accounting Method

The accumulation accounting method allows multiple re-logins until the allocated time period or until the user account is expired. The UAG accounts the time that the user is logged in for Internet access.

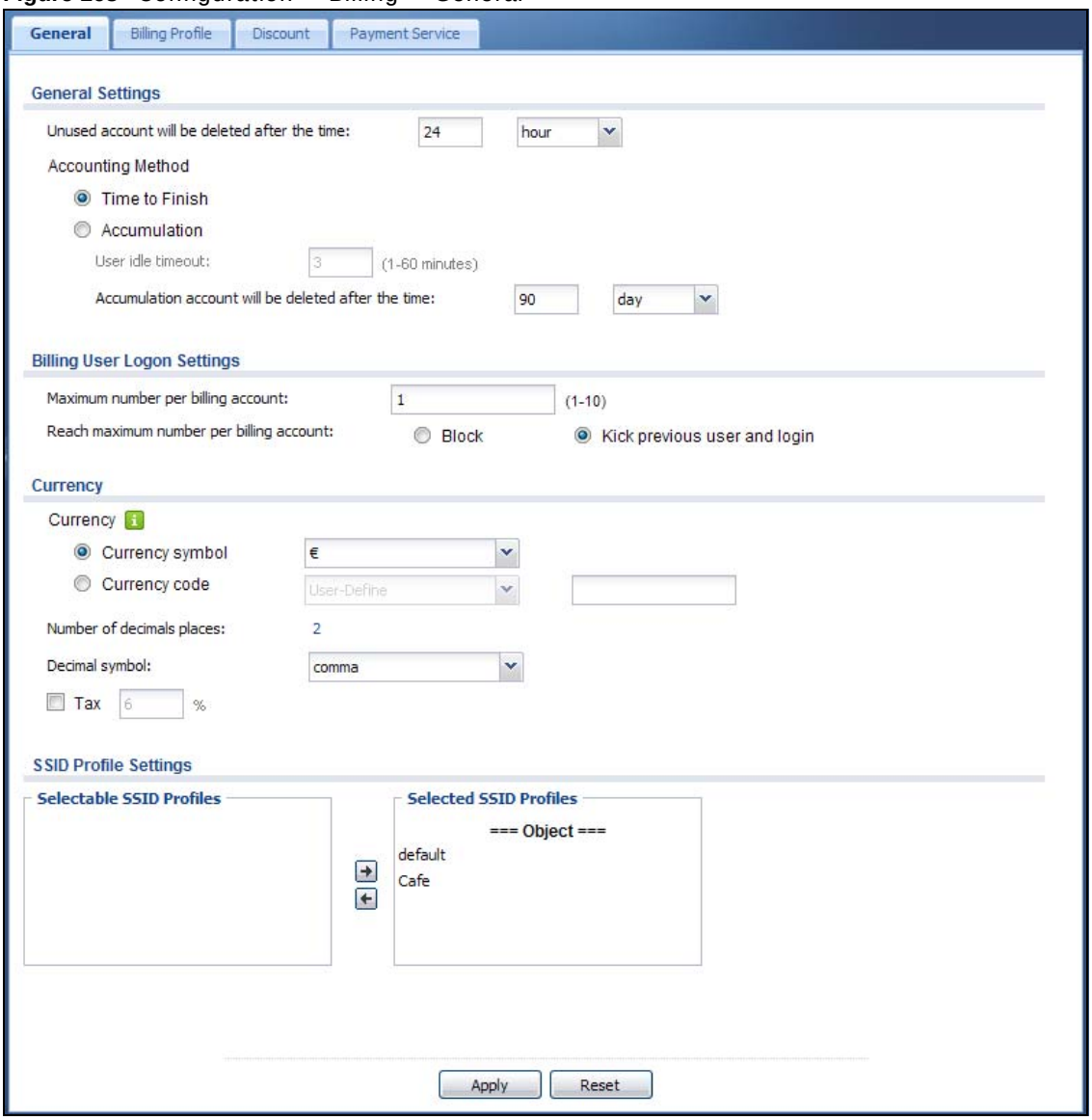
Time-to-finish Accounting Method

The time-to-finish accounting method is good for one-time logins. Once a user logs in, the UAG stores the IP address of the user's computer for the duration of the time allocated. Thus the user does not have to enter the user name and password again for re-login within the allocated time. Once activated, the user account is valid until the allocated time is reached even if the user disconnects Internet access for a certain period within the allocated time. For example, Joe purchases a one-hour time-to-finish account. He starts using the Internet for the first 20 minutes and then disconnects his Internet access to go to a 20-minute meeting. After the meeting, he only has 20 minutes left on his account.

25.2 The General Screen

Use this screen to configure the general billing settings, such as the accounting method, currency unit and the SSID profiles to which the settings are applied. Click **Configuration > Billing > General** to open the following screen.

Figure 168 Configuration > Billing > General



The following table describes the labels in this screen.

Table 115 Configuration > Billing > General

LABEL	DESCRIPTION
General Settings	
Unused account will be deleted after the time:	Enter the number and select a time unit from the drop-down list box to specify how long to wait before the UAG deletes an account that has not been used.

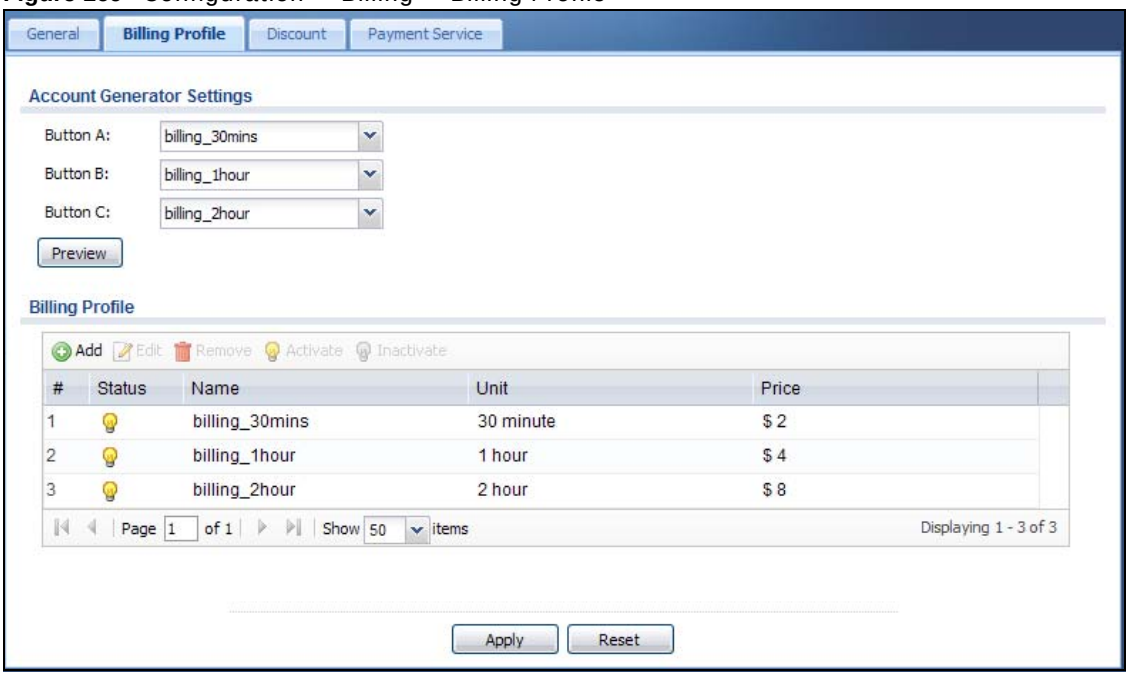
Table 115 Configuration > Billing > General (continued)

LABEL	DESCRIPTION
Accounting Method	Select **Time to Finish** to allow each user a one-time login. Once the user logs in, the system starts counting down the pre-defined usage even if the user stops the Internet access before the time period is finished. If a user disconnects and reconnects before the allocated time expires, the user does not have to enter the user name and password to access the Internet again. Select **Accumulation** to allow each user multiple re-login until the time allocated is used up. The UAG accounts the time that the user is logged in for Internet access.
User idle timeout	The UAG automatically disconnects a computer from the network after a period of inactivity. The user may need to enter the username and password again before access to the network is allowed. If you select **Accumulation**, specify the idle timeout between 1 and 60 minutes.
Accumulation account will be deleted after the time:	Enter the number and select a time unit from the drop-down list box to specify how long to wait before the UAG deletes an idle account. This is for use with accumulation accounting.
Billing User Logon Settings	
Maximum number per billing account	Enter the maximum number of the users that are allowed to log in with the same account.
Reach maximum number per billing account	Select **Block** to stop new users from logging in when the **Maximum number per billing account** is reached. Select **Kick previous user and login** to disassociate the first user that logged in and allow new user to log in when the **Maximum number per billing account** is reached.
Currency	Select the appropriate currency symbol or currency unit. If you set **Currency code** to **User-Define**, enter a three-letter alphabetic code manually.
Number of decimals places	This shows the number of decimal places to be used for billing.
Decimal symbol	Select whether you would like to use a dot (.) or a comma (,) for the decimal point.
Tax	Select this option to charge sales tax for the account. Enter the tax rate (a 6% sales tax is entered as 6).
SSID Profile Settings	The **Selectable SSID Profiles** list displays the name(s) of the SSID profile(s) to which you can apply the general billing settings. To apply settings to an SSID profile, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Selected SSID Profiles** list. To remove an SSID profile, select the name(s) in the **Selected SSID Profiles** list and click the left arrow button.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

25.3 The Billing Profile Screen

Use this screen to configure the billing profiles that defines the maximum Internet access time and charge per time unit. Click **Configuration > Billing > Billing Profile** to open the following screen.

Figure 169 Configuration > Billing > Billing Profile



The following table describes the labels in this screen.

Table 116 Configuration > Billing > Billing Profile

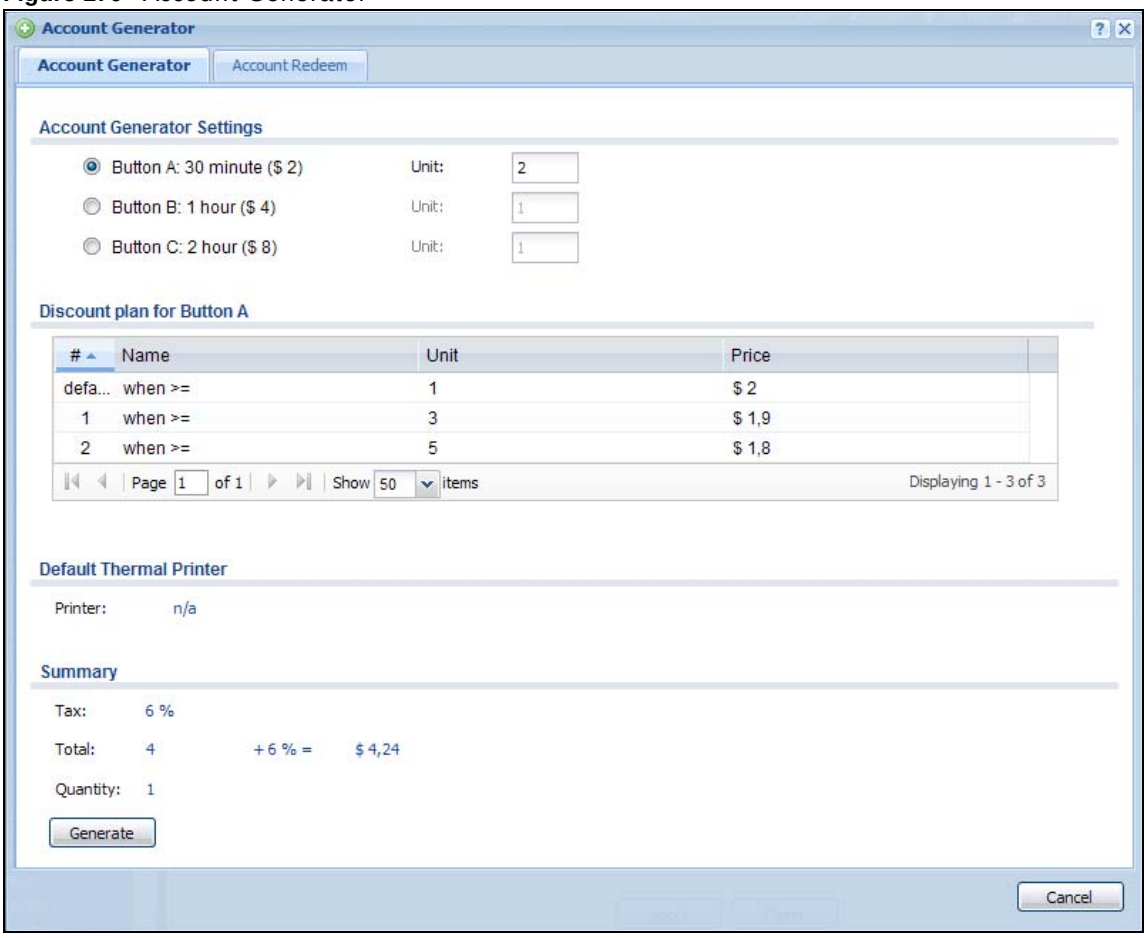
LABEL	DESCRIPTION
Account Generator Settings	
Button A ~ C	Select a billing profile for each button of the web-based account generator. The buttons correspond to the buttons on a connected statement printer.
Preview	Click this button to open the **Account Generator** screen, where you can generate a dynamic guest account and print the account information using a statement printer connected to the UAG (see Section 25.3.1 on page 241 for more information).
Billing Profile	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the descriptive profile name for this entry.
Unit	This field displays the duration of the billing period.
Price	This field displays each profile's price per time unit.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

25.3.1 The Account Generator Screen

The **Account Generator** screen allows you to automatically create dynamic guest accounts (see Section 6.11 on page 73 for more information on dynamic guest accounts).

Click **Configuration > Billing > Billing Profile** and then the **Preview** button to open this screen. You can also open this screen by logging into the Web Configurator with the guest-manager account.

Figure 170 Account Generator



The following table describes the labels in this screen.

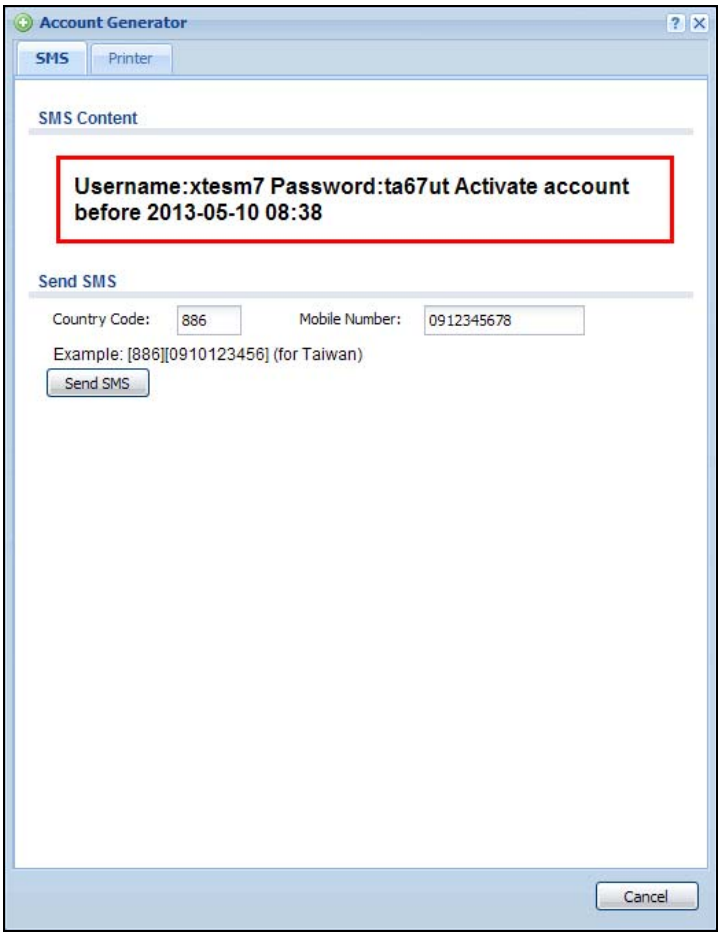
Table 117 Account Generator

LABEL	DESCRIPTION
Account Generator Settings	Select a button and specify how many units of billing period to be charged for new account.
Discount plan for Button x	This section displays only when you enable the discount price plan in the **Billing > Discount** screen.
#	This is the number of each discount level. The default (first) level cannot be edited or deleted. It is created automatically according to the billing profile of the button you select.
Name	This field displays the conditions of each discount level.

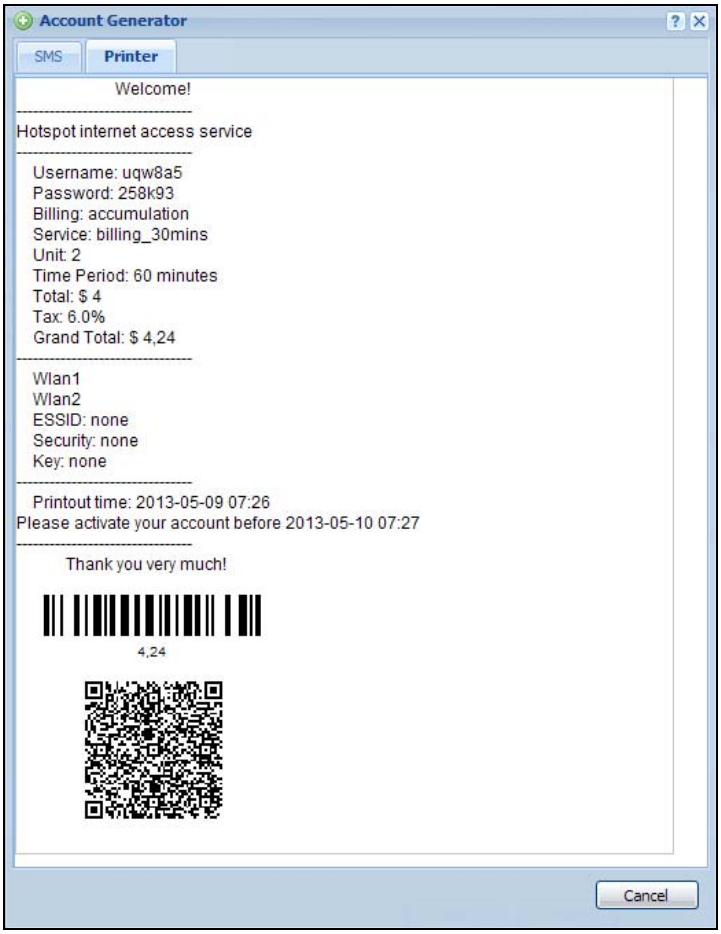
Table 117 Account Generator (continued)

LABEL	DESCRIPTION
Unit	This field displays the duration of the billing period that should be reached before the UAG charges users at this level.
Price	This field displays the price per time unit for each level.
Default Thermal Printer	This displays the information of the printer that is attached to the UAG. It displays **n/a** if there is no printer attached.
Summary	
Tax	This shows the tax rate.
Total	This shows the total price for the account.
Quantity	This shows the number of account to be created.
Generate	Click **Generate** to generate an account based on the billing settings you configure for the selected button in the **Billing Profile** screen. A window displays showing the SMS message and/or a printout preview of the account generated.
Cancel	Click **Cancel** to exit this screen without saving.
Logout	Click **Logout** to log out of the web configurator. This button is available only when you open this screen by logging in with the guest-manager account.

The following figure shows an example SMS message with account information. The **SMS** screen displays only when you enable SMS in the **Configuration > SMS** screen. You can enter the user's mobile phone number and click **Send SMS** to send the account information in an SMS text message to the user's mobile phone. Close this window when you are finished viewing it.



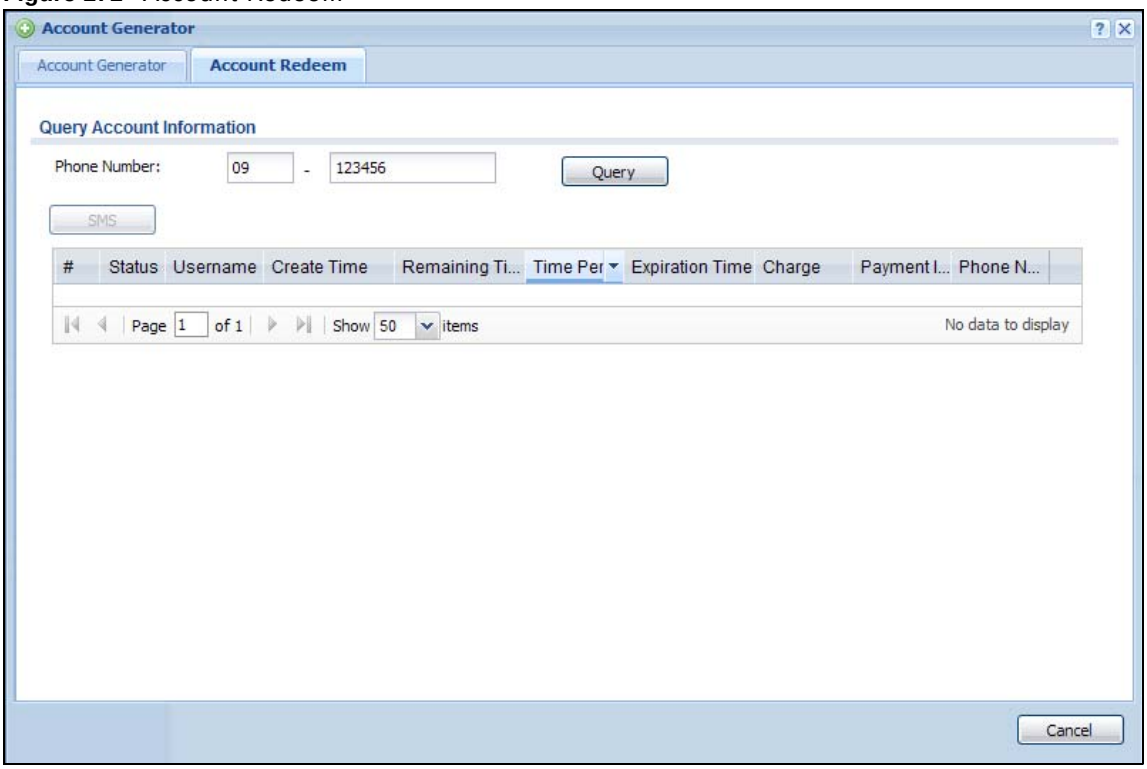
The following figure shows a printout preview example. Close this window when you are finished viewing it.



25.3.2 The Account Redeem Screen

The **Account Redeem** screen allows you to send SMS messages for certain accounts. Click the **Account Redeem** tab in the **Account Generator** screen to open this screen.

Figure 171 Account Redeem



The following table describes the labels in this screen.

Table 118 Account Redeem

LABEL	DESCRIPTION
Query Account Information	
Phone Number	Enter the country code and mobile phone number and click **Query** to display only the accout(S) that has the specified phone number.
SMS	Click this button to send text messages for the accounts in the list below. You can use this button only when SMS is enabled and there is at least one account in the list.
#	This is the index number of the dynamic guest account in the list.
Status	This field displays whether an account expires or not.
Username	This field displays the user name of the account.
Create Time	This field displays when the account was created.
Remaining Time	This field displays the amount of Internet access time remaining for each account.
Time Period	This field displays the total account of time the account can use to access the Internet through the UAG.
Expiration Time	This field displays the date and time the account becomes invalid. Note: Once the time allocated to a dynamic account is used up or a dynamic account remains un-used after the expiration time, the account is deleted from the account list.
Charge	This field displays the total cost of the account.
Payment Info	This field displays the method of payment for each account.
Phone Num	This field displays the mobile phone number for the account.

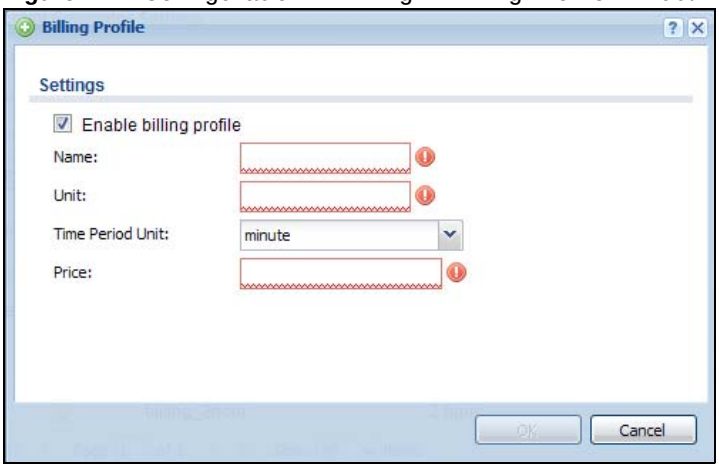
Table 118 Account Redeem (continued)

LABEL	DESCRIPTION
Cancel	Click **Cancel** to exit this screen without saving.
Logout	Click **Logout** to log out of the web configurator. This button is available only when you open this screen by logging in with the guest-manager account.

25.3.3 The Billing Profile Add/Edit Screen

The **Billing Profile Add/Edit** screen allows you to create a new billing profile or edit an existing one. Click **Configuration > Billing > Billing Profile** and then an **Add** or **Edit** icon to open this screen.

Figure 172 Configuration > Billing > Billing Profile > Add/Edit



The following table describes the labels in this screen.

Table 119 Configuration > Billing > Billing Profile > Add/Edit

LABEL	DESCRIPTION
Enable billing profile	Select this option to activate the profile.
Name	Enter a name for the billing profile. You can use up to 31 alphanumeric characters (A-Z, a-z, 0-9) and underscores (_). Spaces are not allowed. The first character must be a letter.
Unit	Set the duration of the billing period. When this period expires, the user's access will be stopped.
Time Period Unit	Select a time period (**minute**, **hour**, or **day**).
Price	Define each profile's price, up to 999999.99, per time unit.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

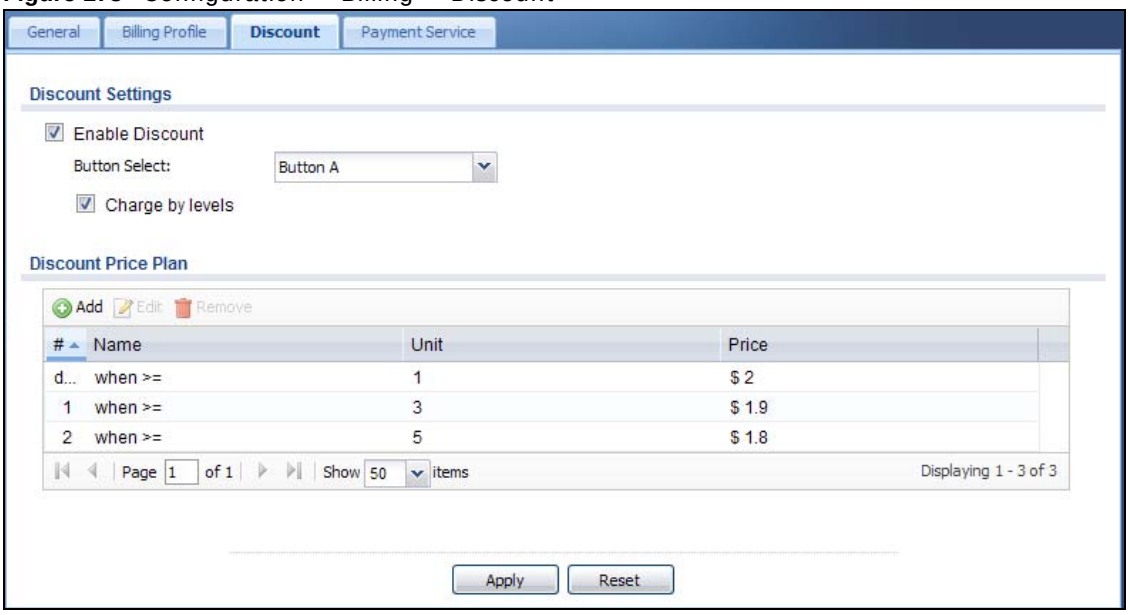
25.4 The Discount Screen

Use this screen to configure a custom discount pricing plan. This is useful for providing reduced rates for purchases of longer periods of time. You can charge higher rates per unit at lower levels

(fewer units purchased) and lower rates per unit at higher levels (more units purchased). Click **Configuration > Billing > Discount** to open the following screen.

Note: The discount price plan does not apply to users who purchase access time online with a credit card.

Figure 173 Configuration > Billing > Discount



The following table describes the labels in this screen.

Table 120 Configuration > Billing > Discount

LABEL	DESCRIPTION
Discount Settings	
Enable Discount	Select the check box to activate the discount price plan.
Button Select	Select a button from the drop-down list box to assign the base charge.
Charge by levels	Select this to charge the rate at each successive level from the first level (most expensive per unit) to the highest level (least expensive per unit) that the total purchase reaches. Otherwise, deselect this to charge all of the user's time units only at the highest level (least expensive) that their total purchase reaches.
Discount Price Plan	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
#	This is the number of each discount level. The default (first) level cannot be edited or deleted. It is created automatically according to the billing profile of the button you select.
Name	This field displays the conditions of each discount level.
Unit	This field displays the duration of the billing period that should be reached before the UAG charges users at this level.

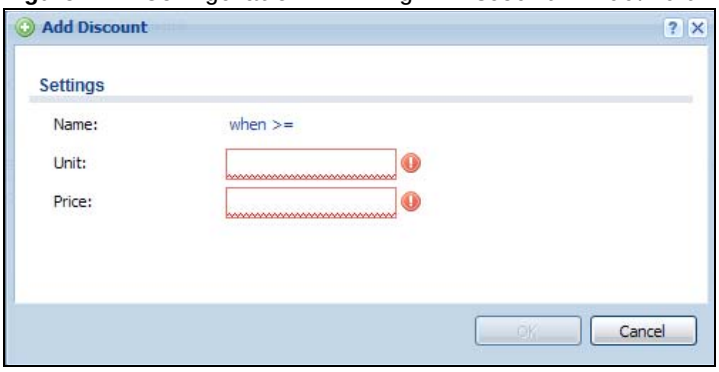
Table 120 Configuration > Billing > Discount (continued)

LABEL	DESCRIPTION
Price	This field displays the price per time unit for each level.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

25.4.1 The Discount Add/Edit Screen

The **Discount Add/Edit** screen allows you to create a new discount level or edit an existing one. Click **Configuration > Billing > Discount** and then an **Add** or **Edit** icon to open this screen.

Figure 174 Configuration > Billing > Discount > Add/Edit



The following table describes the labels in this screen.

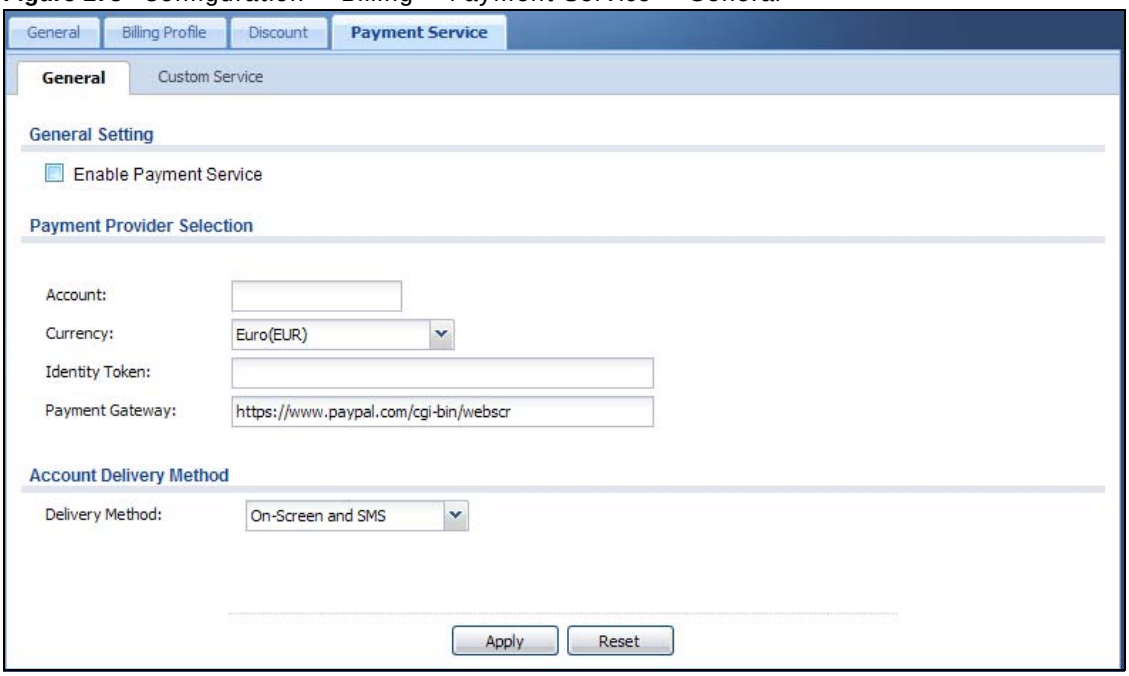
Table 121 Configuration > Billing > Discount > Add/Edit

LABEL	DESCRIPTION
Name	This field displays the conditions of each discount level.
Unit	Set the duration of the billing period that should be reached before the UAG charges users at this level.
Price	Define this level's charge per time unit.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving.

25.5 The Payment Service General Screen

Use this screen to use a credit card service to authorize, process, and manage credit card transactions directly through the Internet. You must register with the supported credit card service before you can configure the UAG to handle credit card transactions. Click **Configuration > Billing > Payment Service** to open the following screen.

Figure 175 Configuration > Billing > Payment Service > General



The following table describes the labels in this screen.

Table 122 Configuration > Billing > payment Service > General

LABEL	DESCRIPTION
General Setting	
Enable Payment Service	Select the check box to use PayPal to authorize credit card payments. Note: After you set up web authentication policies and enable the online payment service on the UAG, a link displays in the login screen when users try to access the Internet. The link redirects users to a screen where they can make online payments by credit card to purchase access time and get dynamic guest account information.
Payment Provider Selection	
Account	You should already have a PayPal account to receive credit card payments. Enter your PayPal account name.
Currency	Select the currency in which payments are made. The available options depend on currencies that PayPal supports.
Identity Token	Enter the ID token provided to you by PayPal after successfully applying for your PayPal account.
Payment Gateway	Enter the address of the PayPal gateway provided to you by PayPal after applying for your PayPal account.
Account Delivery Method	

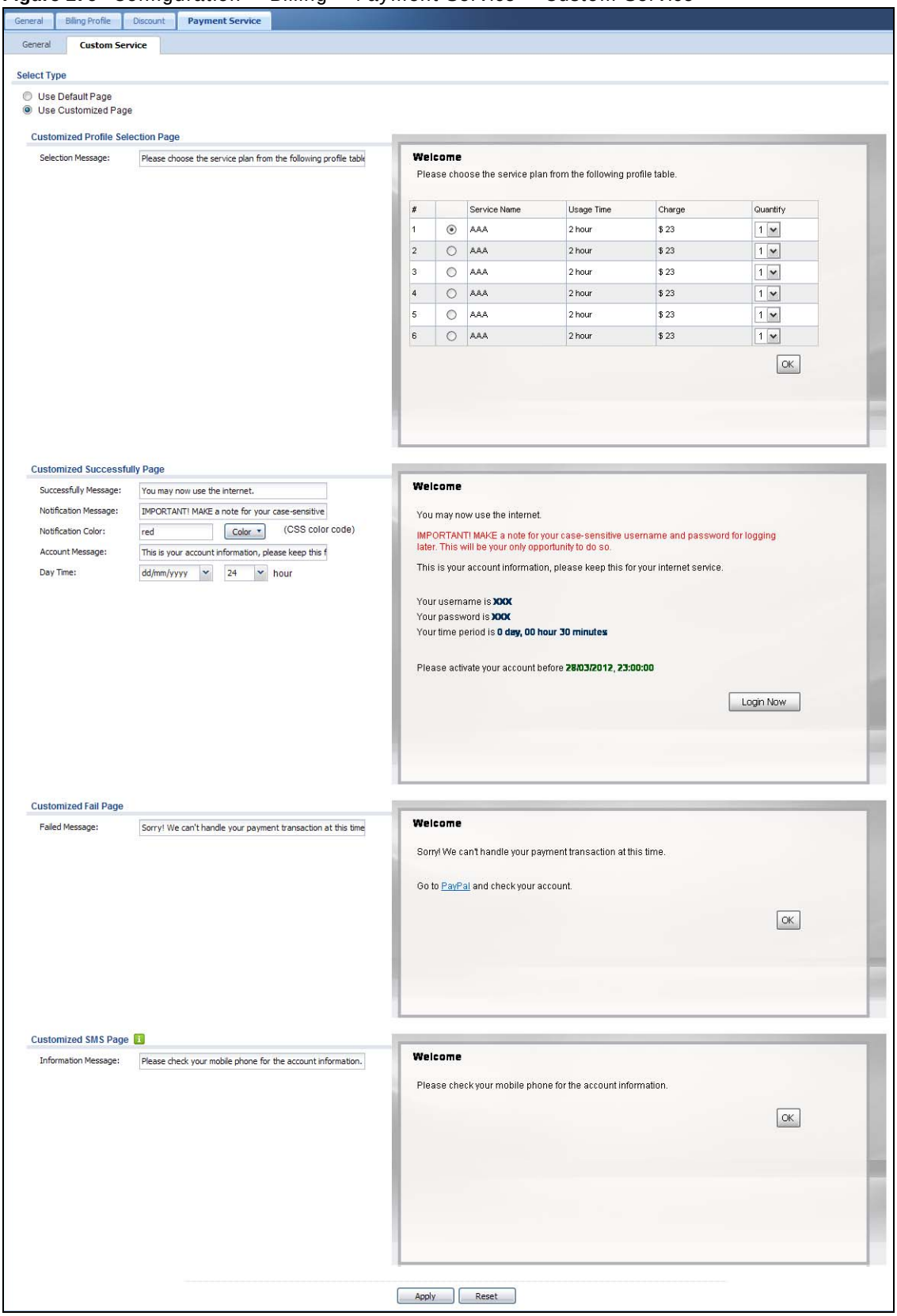
Table 122 Configuration > Billing > payment Service > General (continued)

LABEL	DESCRIPTION
Delivery Method	Specify how the UAG provides dynamic guest account information after the user's online payment is done. Select **On-Screen** to display the user account information in the web screen. Select **SMS** to use Short Message Service (SMS) to send account information in a text message to the user's mobile device. Select **On-Screen and SMS** to provide the account information both in the web screen and via SMS text messages. Note: You should have enabled SMS in the **Configuration > SMS** screen to send text messages to the user's mobile device.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

25.5.1 The Payment Service Custom Service Screen

Use this screen to customize the online payment service pages that displays after an unauthorized user click the link in the Web Configurator login screen to purchase access time. Click **Configuration > Billing > Payment Service > Custom Service** to open the following screen.

Figure 176 Configuration > Billing > Payment Service > Custom Service



The following table describes the labels in this screen.

Table 123 Configuration > Billing > payment Service > General

LABEL	DESCRIPTION
Select Type	
Use Default Page	Select this to use the default online payment service page built into the device. If you later create a custom online payment service page, you can still return to the UAG's default page as it is saved indefinitely.
Use Customized Page	Select this to use a custom online payment service page instead of the default one built into the UAG. Once this option is selected, the custom page controls below become active.
Customized Profile Selection Page	
Selection Message	Enter a note to display in the first welcome page that allows users to choose a billing period they want. Use up to 1024 printable ASCII characters. Spaces are allowed.
Customized Successfully Page	
Successfully Message	Enter a note to display in the second page after the user's online payment is made successfully. Use up to 1024 printable ASCII characters. Spaces are allowed.
Notification Message	Enter the important information you want to display. Use up to 1024 printable ASCII characters. Spaces are allowed.
Notification Color	Specify the font color of the important information. You can use the color palette chooser, or enter a color value of your own.
Account Message	Enter a note to display above the user account information. Use up to 1024 printable ASCII characters. Spaces are allowed.
Day Time	Select the format in which you want to display the date and how long an account is allowed to stay un-used before it expires.
Customized Fail Page	
Failed Message	Enter a note to display when the user's online payment failed. Use up to 1024 printable ASCII characters. Spaces are allowed.
Customized SMS Page	
Information Message	Enter a note to display when you set the UAG to send account information via SMS text messages. Use up to 1024 printable ASCII characters. Spaces are allowed.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

26

Printer Manager

26.1 Overview

You can create dynamic guest accounts and print guest account information by pressing the button on an external statement printer, such as SP350E.

Make sure that the printer is connected to the appropriate power and the UAG, and that there is printing paper in the printer. Refer to the printer's documentation for details.

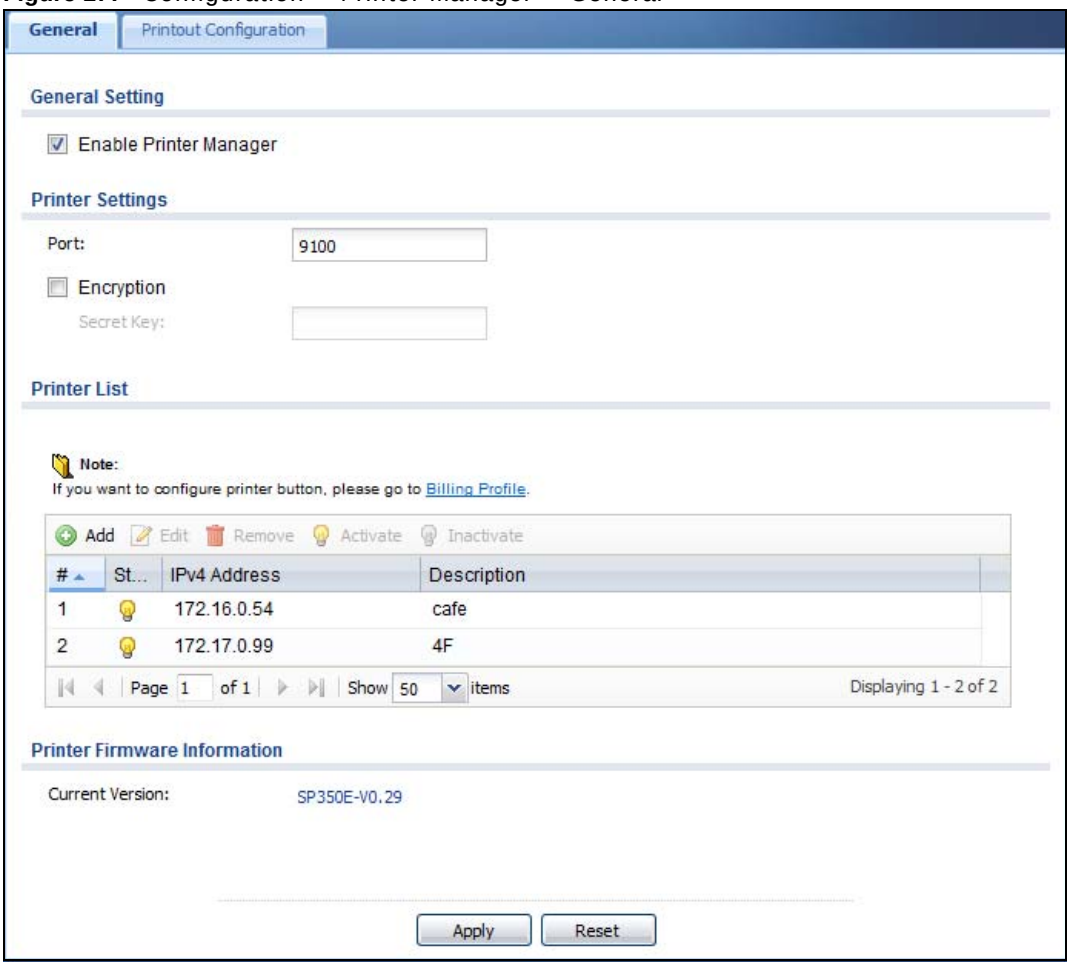
26.1.1 What You Can Do in this Chapter

- Use the **General** screen (see Section 26.2 on page 252) to configure the printer list and enable printer management.
- Use the **Printout Configuration** screen (see Section 26.3 on page 254) to customize the account printout.

26.2 The General Screen

Use this screen to configure a printer list and allow the UAG to monitor the printer status. Click **Configuration > Printer Manager > General** to open the following screen.

Figure 177 Configuration > Printer Manager > General



The following table describes the labels in this screen.

Table 124 Configuration > Billing > General

LABEL	DESCRIPTION
General Settings	
Enable Printer Manager	Select the check box to allow the UAG to manage and moniter the printer status.
Printer Settings	
Port	Enter the number of port on which the UAG sends data to the printer for it to print.
Encryption	Select the check box to turn on data encryption. Data transmitted between the UAG and the printer will be encrypted with a secret key
Secret Key	Enter four alphanumeric characters (A-Z, a-z, 0-9) to specify a key for data encryption.
Printer List	Use this section to add the printer(s) that can be managed by the UAG.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.

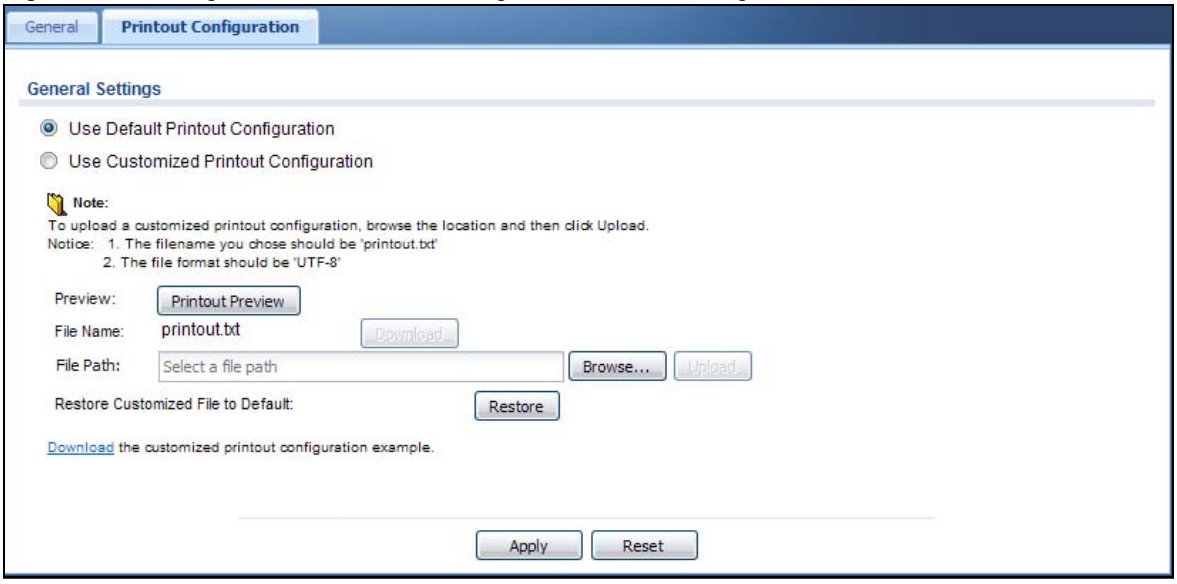
Table 124 Configuration > Billing > General (continued)

LABEL	DESCRIPTION
#	This field is a sequential value, and it is not associated with any entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
IPv4 Address	This field displays the IP address of the printer.
Description	This field displays the descriptive name for the printer.
Printer Firmware Information	
Current Version	This is the version of the printer firmware currently uploaded to the UAG. The UAG automatically installs it in the connected printers to make sure the printers are upgraded to the same version.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

26.3 The Printout Configuration Screen

Use this screen to customize the account printout. Click **Configuration > Printer Manager > Printout Configuration** to open the following screen.

Figure 178 Configuration > Printer Manager > Printout Configuration



The following table describes the labels in this screen.

Table 125 Configuration > Printer Manager > Printout Configuration

LABEL	DESCRIPTION
Use Default Printout Configuration	Select this to use the default account printout format built into the device. If you later create a custom account printout format, you can still return to the UAG's default format as it is saved indefinitely.
Use Customized Printout Configuration	Select this to use a custom account printout format instead of the default one built into the UAG. Once this option is selected, the custom format controls below become active.

Table 125 Configuration > Printer Manager > Printout Configuration (continued)

LABEL	DESCRIPTION
Preview	Click the button to display a preview of account printout format you uploaded to the UAG.
File Name	This shows the file name of account printout format file in the UAG. Click **Download** to download the account printout format file from the UAG to your computer.
File Path / Browse / Upload	Browse for the account printout format file or enter the file path in the available input box, then click the **Upload** button to put it on the UAG.
Restore Customized File to Default	Click **Restore** to set the UAG back to use the default built-in account printout format.
Download	Click this to download an example account printout format file from the UAG for your reference.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

26.3.1 Reports Overview

The SP350E allows you to print status reports about the guest accounts and general UAG system information. Simply press a key combination on the SP350E to print a report instantly without accessing the web configurator.

The following lists the reports that you can print using the SP300E.

- Daily account summary
- Monthly account summary
- Last month account summary
- System status

26.3.2 Key Combinations

The following table lists the key combination to print each report.

Note: You must press the key combination on the SP350E within five seconds to print.

Table 126 Report Printing Key Combinations

REPORT TYPE	KEY COMBINATION
Daily Account Summary	A B C A A
Monthly Account Summary	A B C B A
Last Month Account Summary	A B C B B
System Status	A B C C A

The following sections describe each report printout in detail.

26.3.3 Daily Account Summary

The daily account report lists the accounts printed during the current day, the current day's total number of accounts and the total charge. It covers the accounts that have been printed during the current day starting from midnight (not the past 24 hours). For example, if you press the daily account key combination on 2013/05/10 at 20:00:00, the daily account report includes the accounts created on 2013/05/10 between 00:00:01 and 19:59:59.

Key combination: A B C A A

The following figure shows an example.

Figure 179 Daily Account Example

```
          Daily Account
   ---------------------------
            2013/05/10

         Username  Price
   ---------------------------
          p2m6pf52 1.00
          s4pcms28 2.00
   ---------------------------
        TOTAL ACCOUNTS: 2
       TOTAL PRICE: $ 3.00
   ---------------------------
      2013/05/10  20:00:00
           ---End---
```

26.3.4 Monthly Account Summary

The monthly account report lists the accounts printed during the current month, the current month's total number of accounts and the total charge. It covers the accounts that have been printed during the current month starting from midnight of the first day of the current month (not the past one month period). For example, if you press the monthly account key combination on 2013/05/17 at 20:00:00, the monthly account report includes the accounts created from 2013/05/01 at 00:00:01 to 2013/05/17 at 19:59:59.

Key combination: A B C B A

The following figure shows an example.

Figure 180 Monthly Account Example

```
        Monthly Account
----------------------------
           2013/05

       Username  Price
----------------------------
         p2m6pf52 1.00
         s4pcms28 2.00
         7ufm7z22 2.00
         qm5fxn95 6.00

----------------------------
      TOTAL ACCOUNTS: 4
    TOTAL PRICE: $ 11.00
----------------------------
    2013/05/17  20:00:11
         ---End---
```

26.3.5 Account Report Notes

The daily, monthly or last month account report holds up to 2000 entries. If there are more than 2000 accounts created in the same month or same day, the account report's calculations only include the latest 2000.

For example, if 2030 accounts (each priced at $1) have been created from 2013/05/01 00:00:00 to 2013/05/31 19:59:59, the monthly account report includes the latest 2000 accounts, so the total would be $2,000 instead of $2,030.

Use the **Monitor > System Status > Dynamic Guest** screen to see the accounts generated on another day or month (up to 2000 entries total).

26.3.6 System Status

This report shows the current system information such as the host name and WAN IP address.

Key combination: A B C C A

The following figure shows an example.

Figure 181 System Status Example

```
            System Status
-------------------------------------
          Item   Description
-------------------------------------
            SYST   02:02:35
            WAST   Link up
            WLST   Activate
          FWVR   2.50(AACG.0)
              BTVR   1.22
       WAMA   00-90-0E-00-4A-29
       LAMA   00-90-0E-00-4A-30
          WAIP   10.21.2.267
           LAIP   172.16.0.1
           WLIP   10.59.1.1
          DHSP   10.59.1.33
          DHEP   10.59.1.254
-------------------------------------
               CPUS   5%
               MEMS  40%
               DKST   5%
-------------------------------------
          2012/04/12 17:10:22
               ---End---
```

The following table describes the labels in this report.

Table 127 System Status

LABEL	DESCRIPTION
SYST	This field displays the time since the system was last restarted.
WAST	This field displays the WAN connection status.
WLST	This field displays the status of the UAG's wireless LAN.
FWVR	This field displays the version of the firmware on the UAG.
BTVR	This field displays the version of the bootrom.
WAMA	This field displays the MAC address of the UAG on the WAN.
LAMA	This field displays the MAC address of the UAG on the LAN.
WAIP	This field displays the IP address of the WAN port on the UAG.
LAIP	This field displays the IP address of the LAN port on the UAG.
WLIP	This field displays the IP address of the wireless LAN interface on the UAG.
DHSP	This field displays the first of the continuous addresses in the IP address pool.
DHEP	This field displays the end of the continuous addresses in the IP address pool.
CPUS	This field displays the UAG's recent CPU usage.
MEMS	This field displays the UAG's recent memory usage.
DKST	This field displays what percentage of the UAG's onboard flash memory is currently being used.

27

Free Time

27.1 Overview

With Free Time, the UAG can create dynamic guest accounts that allow users to browse the Internet free of charge for a specified period of time.

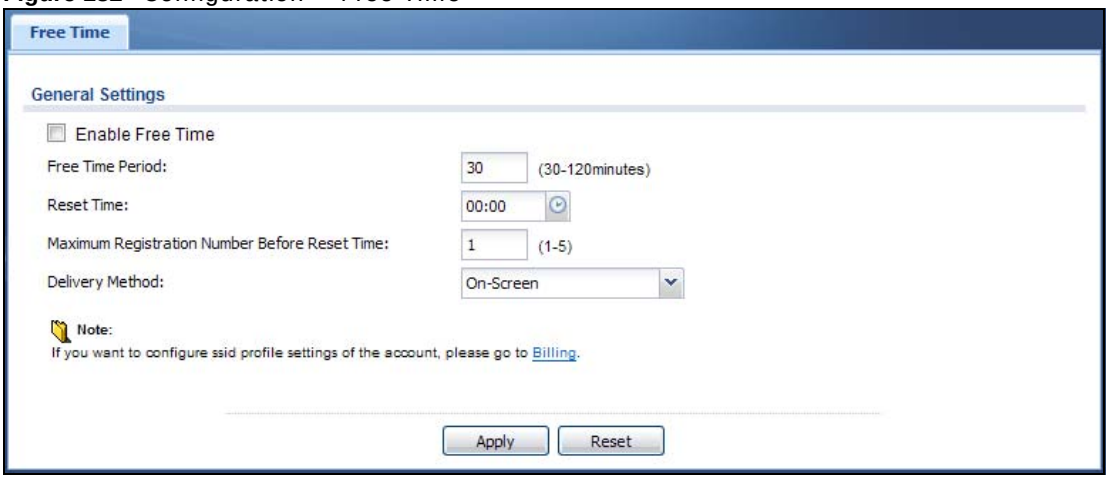
27.1.1 What You Can Do in this Chapter

Use the **Free Time** screen (see Section 27.2 on page 259) to turn on this feature to allow users to get a free account for Internet surfing during the specified time period.

27.2 The Free Time Screen

Use this screen to enable and configure the free time settings. Click **Configuration > Free Time** to open the following screen.

Figure 182 Configuration > Free Time

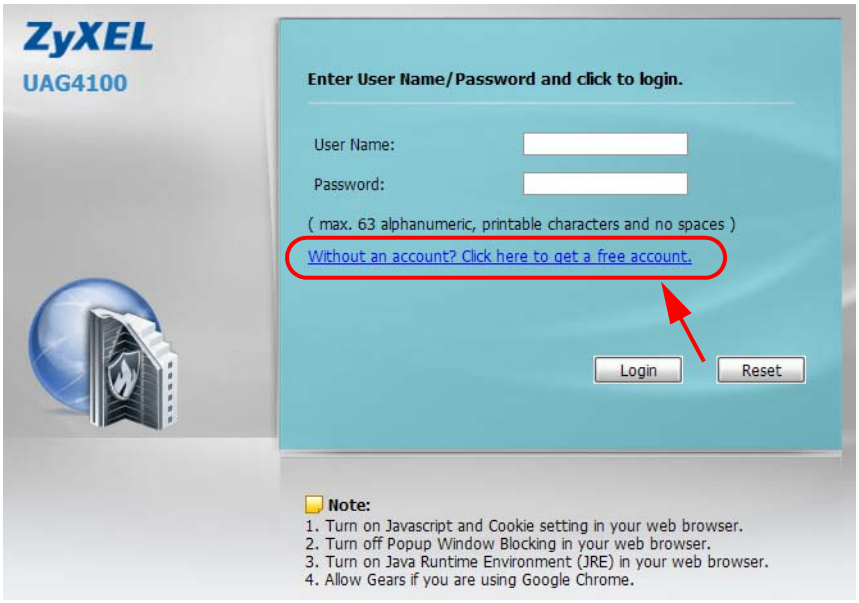


The following table describes the labels in this screen.

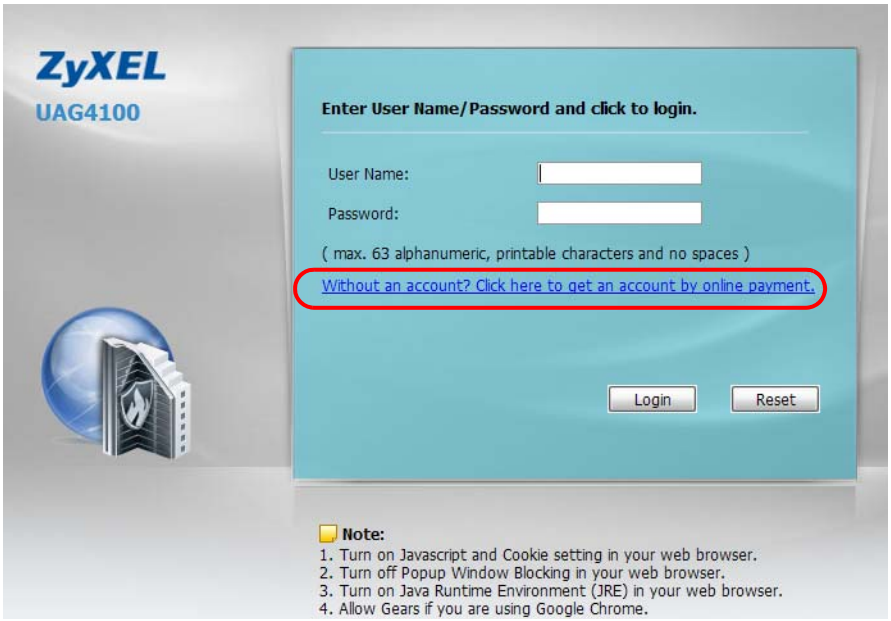
Table 128 Configuration > Free Time

LABEL	DESCRIPTION
Enable Free Time	Select the check box to turn on the free time feature. Note: After you set up web authentication policies and enable the free time feature on the UAG, a link displays in the login screen when users try to access the Internet. The link redirects users to a screen where they can get a free account.
Free Time Period	Select the duration of time period for which the free time account is allowed to access the Internet.
Reset Time	Select the time in 24-hour format at which the new free time account is allowed to access the Internet.
Maximum Registration Number Before Reset Time	Enter the maximum number of the users that are allowed to log in for Internet access with a free guest account before the time specified in the **Reset Time** field. For example, if you set the **Maximum Registration Number Before Reset Time** to 1 and the **Reset Time** to 13:00, even the first free guest account has expired at 11:30, the second account still cannot access the Internet until 13:00.
Delivery Method	Specify how the UAG provides dynamic guest account information. Select **On-Screen** to display the user account information in the web screen. Select **SMS** to use Short Message Service (SMS) to send account information in a text message to the user's mobile device. Select **On-Screen and SMS** to provide the account information both in the web screen and via SMS text messages. Note: You should have enabled SMS in the **Configuration > SMS** screen to send text messages to the user's mobile device.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

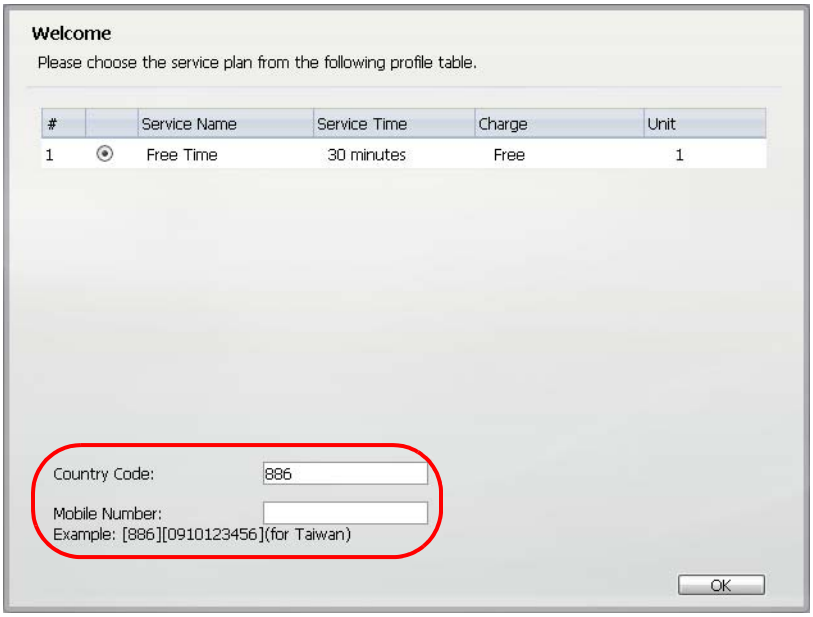
The following figure shows an example login screen with a link to create a free guest account.



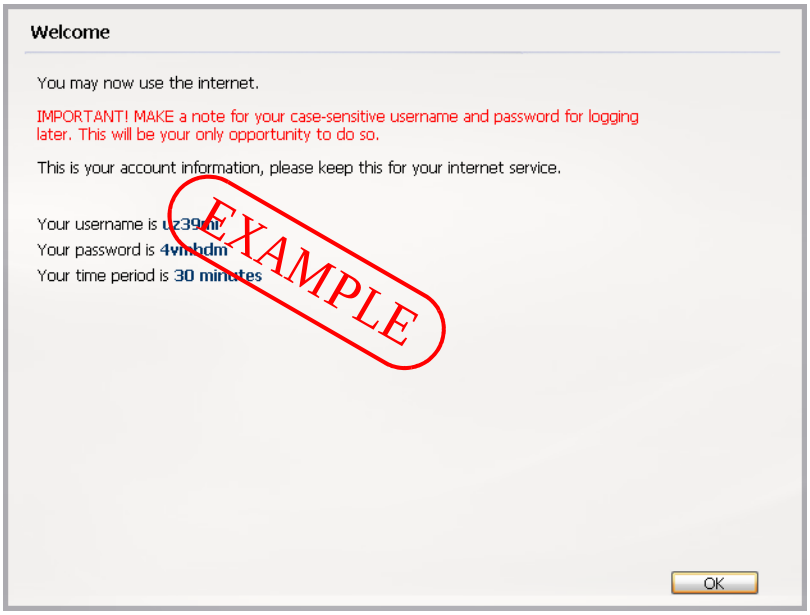
If you enable both online payment service and free time feature on the UAG, the link description in the login screen will be mainly for online payment service. You can still click the link to get a free account.



If SMS is enabled on the UAG, you have to enter your mobile phone number before clicking **OK** to get a free guest account.



The guest account information then displays in the screen and/or is sent to the configured mobile phone number.



28

SMS

28.1 Overview

The UAG supports Short Message Service (SMS) to send short text messages to mobile phone devices. At the time of writing, the UAG uses ViaNett as the SMS gateway to help forward SMS messages. You must already have a Vianett account in order to use the SMS service.

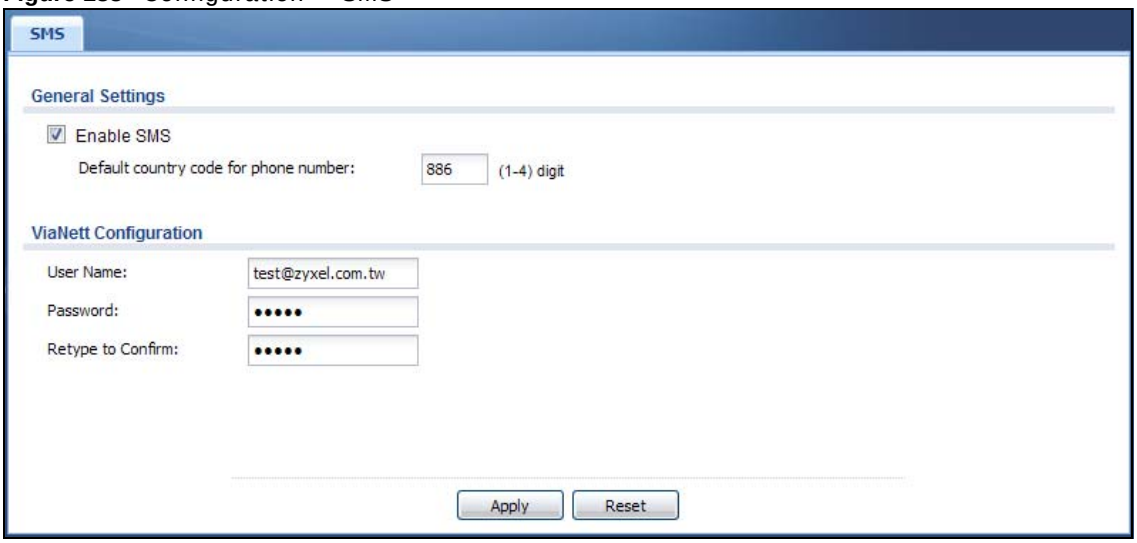
28.1.1 What You Can Do in this Chapter

Use the **SMS** screen (see Section 28.2 on page 263) to turn on the SMS service on the UAG.

28.2 The SMS Screen

Use this screen to enable SMS in order to send dynamic guest account information in text messages. Click **Configuration > SMS** to open the following screen.

Figure 183 Configuration > SMS



The following table describes the labels in this screen.

Table 129 Configuration > SMS

LABEL	DESCRIPTION
General Settings	
Enable SMS	Select the check box to turn on the SMS service.

Table 129 Configuration > SMS (continued)

LABEL	DESCRIPTION
Default country code for phone number	Enter the default country code for the mobile phone number to which you want to send SMS messages.
ViaNett Configuration	
User Name	Enter the user name for your ViaNett account.
Password	Type the Password associated with the user name.
Retype to Confirm	Type your password again for confirmation.
Apply	Click this button to save your changes to the UAG.
Reset	Click this button to return the screen to its last-saved settings.

29

Bandwidth Management

29.1 Overview

Bandwidth management provides a convenient way to manage the use of various services on the network. It manages general protocols (for example, HTTP and FTP) and applies traffic prioritization to enhance the performance of delay-sensitive applications like voice and video.

29.1.1 What You Can Do in this Chapter

Use the **BWM** screens (see Section 29.2 on page 269) to control bandwidth for services passing through the UAG, and it identifies the conditions that refine this.

29.1.2 What You Need to Know

When you allow a service, you can restrict the bandwidth it uses. It controls TCP and UDP traffic. Use policy routes to manage other types of traffic (like ICMP).

Note: Bandwidth management in policy routes has priority over policy routes to manage the bandwidth of TCP and UDP traffic.

If you want to use a service, make sure both the firewall allow the service's packets to go through the UAG.

Note: The UAG checks firewall rules before it checks bandwidth management rules for traffic going through the UAG.

Bandwidth management examines every TCP and UDP connection passing through the UAG. Then, you can specify, by port, whether or not the UAG continues to route the connection.

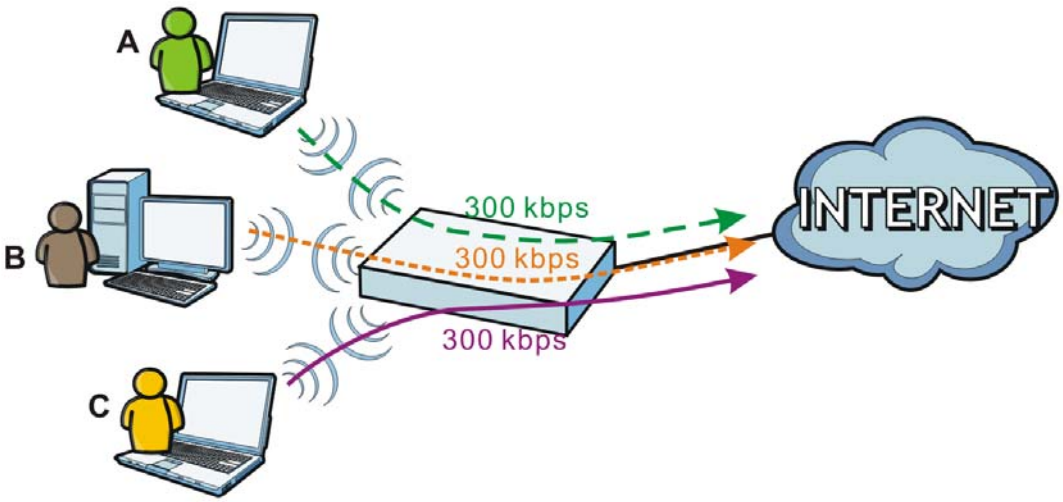
BWM Type

The UAG supports two types of bandwidth management: **Shared** and **Per-user**.

The **Shared** BWM type is selected by default in a bandwidth management rule. All users to which the rule is applied need to share the bandwidth configured in the rule.

If the BWM type is set to **Per-uer** in a rule, every user that matches the rule can use up to the configured bandwidth by his/her own.

In the following example, you configure a **Per-user** bandwidth management rule for **billing-users** to limit outgoing traffic to 300 kbs. Then all billing-users (**A**, **B** and **C**) can send 300 kbps of traffic.



DiffServ and DSCP Marking

QoS is used to prioritize source-to-destination traffic flows. All packets in the same flow are given the same priority. CoS (class of service) is a way of managing traffic in a network by grouping similar types of traffic together and treating each type as a class. You can use CoS to give different priorities to different packet types.

DiffServ (Differentiated Services) is a class of service (CoS) model that marks packets so that they receive specific per-hop treatment at DiffServ-compliant network devices along the route based on the application types and traffic flow. Packets are marked with DiffServ Code Points (DSCPs) indicating the level of service desired. This allows the intermediary DiffServ-compliant network devices to handle the packets differently depending on the code points without the need to negotiate paths or remember state information for every flow. In addition, applications do not have to request a particular service or give advanced notice of where the traffic is going.

Connection and Packet Directions

Bandwidth management looks at the connection direction, that is from which interface the connection was initiated and to which interface the connection is going.

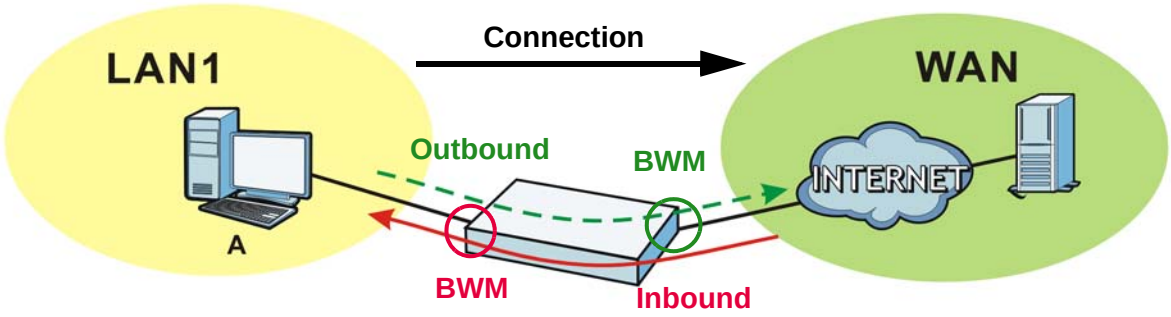
A connection has outbound and inbound packet flows. The UAG controls the bandwidth of traffic of each flow as it is going out through an interface.

- The outbound traffic flows from the connection initiator to the connection responder.
- The inbound traffic flows from the connection responder to the connection initiator.

For example, a LAN1 to WAN connection is initiated from LAN1 and goes to the WAN.

- Outbound traffic goes from a LAN1 device to a WAN device. Bandwidth management is applied before sending the packets out a WAN interface on the UAG.
- Inbound traffic comes back from the WAN device to the LAN1 device. Bandwidth management is applied before sending the traffic out a LAN1 interface.

Figure 184 LAN1 to WAN Connection and Packet Directions

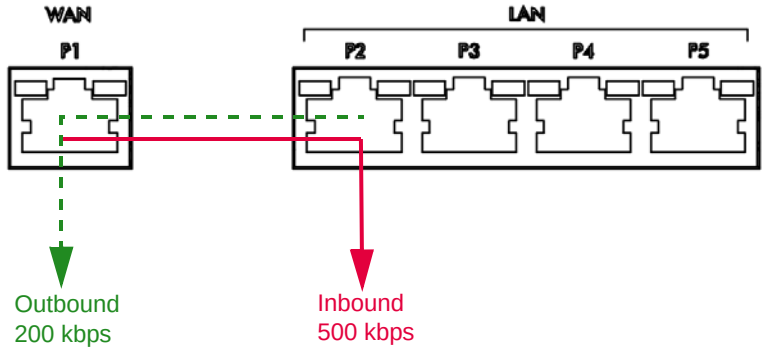


Outbound and Inbound Bandwidth Limits

You can limit an application's outbound or inbound bandwidth. This limit keeps the traffic from using up too much of the out-going interface's bandwidth. This way you can make sure there is bandwidth for other applications. When you apply a bandwidth limit to outbound or inbound traffic, each member of the out-going zone can send up to the limit. Take a LAN1 to WAN policy for example.

- Outbound traffic is limited to 200 kbps. The connection initiator is on the LAN1 so outbound means the traffic traveling from the LAN1 to the WAN. Each of the WAN zone's two interfaces can send the limit of 200 kbps of traffic.
- Inbound traffic is limited to 500 kbs. The connection initiator is on the LAN1 so inbound means the traffic traveling from the WAN to the LAN1.

Figure 185 LAN1 to WAN, Outbound 200 kbps, Inbound 500 kbps



Bandwidth Management Priority

- The UAG gives bandwidth to higher-priority traffic first, until it reaches its configured bandwidth rate.
- Then lower-priority traffic gets bandwidth.
- The UAG uses a fairness-based (round-robin) scheduler to divide bandwidth among traffic flows with the same priority.
- The UAG automatically treats traffic with bandwidth management disabled as priority 7 (the lowest priority).

Maximize Bandwidth Usage

Maximize bandwidth usage allows applications with maximize bandwidth usage enabled to “borrow” any unused bandwidth on the out-going interface.

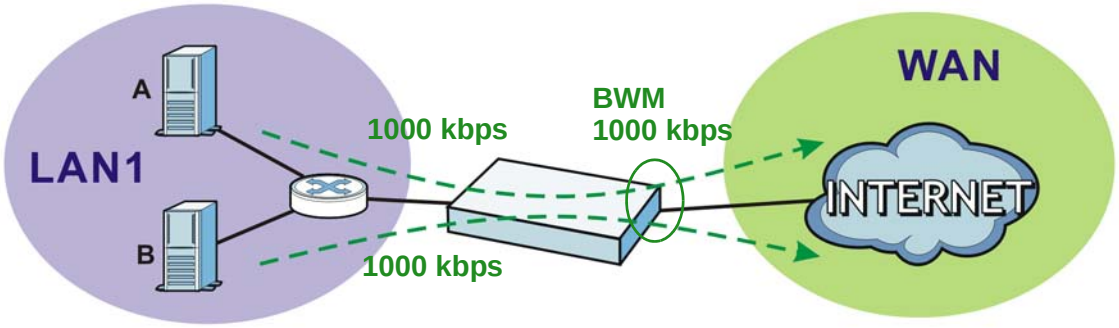
After each application gets its configured bandwidth rate, the UAG uses the fairness- based scheduler to divide any unused bandwidth on the out-going interface amongst applications that need more bandwidth and have maximize bandwidth usage enabled.

Unused bandwidth is divided equally. Higher priority traffic does not get a larger portion of the unused bandwidth.

Bandwidth Management Behavior

The following sections show how bandwidth management behaves with various settings. For example, you configure LAN1 to WAN policies for FTP servers **A** and **B**. Each server tries to send 1000 kbps, but the WAN is set to a maximum outgoing speed of 1000 kbps. You configure policy A for server **A**’s traffic and policy B for server **B**’s traffic.

Figure 186 Bandwidth Management Behavior



Configured Rate Effect

In the following table the configured rates total less than the available bandwidth and maximize bandwidth usage is disabled, both servers get their configured rate.

Table 130 Configured Rate Effect

POLICY	CONFIGURED RATE	MAX. B. U.	PRIORITY	ACTUAL RATE
A	300 kbps	No	1	300 kbps
B	200 kbps	No	1	200 kbps

Priority Effect

Here the configured rates total more than the available bandwidth. Because server **A** has higher priority, it gets up to it’s configured rate (800 kbps), leaving only 200 kbps for server **B**.

Table 131 Priority Effect

POLICY	CONFIGURED RATE	MAX. B. U.	PRIORITY	ACTUAL RATE
A	800 kbps	Yes	1	800 kbps
B	1000 kbps	Yes	2	200 kbps

Maximize Bandwidth Usage Effect

With maximize bandwidth usage enabled, after each server gets its configured rate, the rest of the available bandwidth is divided equally between the two. So server **A** gets its configured rate of 300 kbps and server **B** gets its configured rate of 200 kbps. Then the UAG divides the remaining bandwidth (1000 - 500 = 500) equally between the two (500 / 2 = 250 kbps for each). The priority has no effect on how much of the unused bandwidth each server gets.

So server **A** gets its configured rate of 300 kbps plus 250 kbps for a total of 550 kbps. Server **B** gets its configured rate of 200 kbps plus 250 kbps for a total of 450 kbps.

Table 132 Maximize Bandwidth Usage Effect

POLICY	CONFIGURED RATE	MAX. B. U.	PRIORITY	ACTUAL RATE
A	300 kbps	Yes	1	550 kbps
B	200 kbps	Yes	2	450 kbps

Priority and Over Allotment of Bandwidth Effect

Server **A** has a configured rate that equals the total amount of available bandwidth and a higher priority. You should regard extreme over allotment of traffic with different priorities (as shown here) as a configuration error. Even though the UAG still attempts to let all traffic get through and not be lost, regardless of its priority, server **B** gets almost no bandwidth with this configuration.

Table 133 Priority and Over Allotment of Bandwidth Effect

POLICY	CONFIGURED RATE	MAX. B. U.	PRIORITY	ACTUAL RATE
A	1000 kbps	Yes	1	999 kbps
B	1000 kbps	Yes	2	1 kbps

Finding Out More

- See DSCP Marking and Per-Hop Behavior on page 147 for a description of DSCP marking.

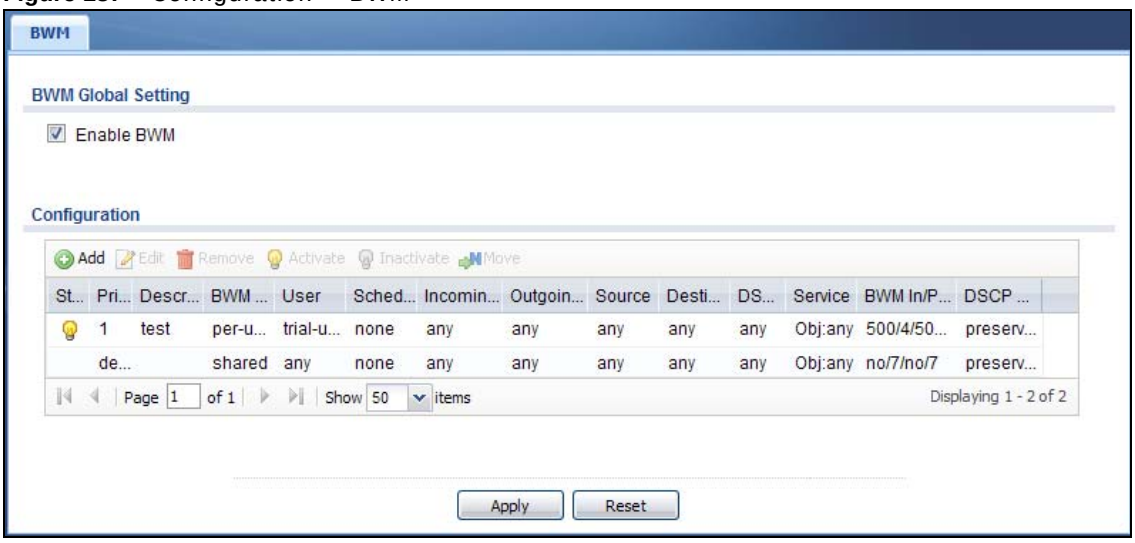
29.2 The Bandwidth Management Screen

The Bandwidth management screens control the bandwidth allocation for TCP and UDP traffic. You can use source interface, destination interface, destination port, schedule, user, source, destination information, DSCP code and service type as criteria to create a sequence of specific conditions, similar to the sequence of rules used by firewalls, to specify how the UAG handles the DSCP value and allocate bandwidth for the matching packets.

Click **Configuration > BWM** to open the following screen. This screen allows you to enable/disable bandwidth management and add, edit, and remove user-defined bandwidth management policies.

The default bandwidth management policy is the one with the priority of “default”. It is the last policy the UAG checks if traffic does not match any other bandwidth management policies you have configured. You cannot remove, activate, deactivate or move the default bandwidth management policy.

Figure 187 Configuration > BWM



The following table describes the labels in this screen. See Section 29.2.1 on page 271 for more information as well.

Table 134 Configuration > BWM

LABEL	DESCRIPTION
Enable BWM	Select this check box to activate management bandwidth.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change an entry's position in the numbered list, select it and click **Move** to display a field to type a number for where you want to put that entry and press [ENTER] to move the entry to the number that you typed.
Status	The activate (light bulb) icon is lit when the entry is active and dimmed when the entry is inactive. The status icon is not available for the default bandwidth management policy.
Priority	This is the position of your bandwidth management policy in the list. The ordering of your rules is important as rules are applied in sequence. This field displays **default** for the default bandwidth management policy that the UAG performs on traffic that does not match any other bandwidth management policy.
Description	This is the descriptive name of the policy.
BWM Type	This is the bandwidth management type of the policy.
User	This is the user name or user group to which the policy applies. If **any** displays, the policy applies to all users.
Schedule	This is the schedule that defines when the policy applies. **none** means the policy always applies.
Incoming Interface	This is the source interface of the traffic to which this policy applies.
Outgoing Interface	This is the destination interface of the traffic to which this policy applies.
Source	This is the source address or address group for whom this policy applies. If **any** displays, the policy is effective for every source.

Table 134 Configuration > BWM (continued)

LABEL	DESCRIPTION
Destination	This is the destination address or address group for whom this policy applies. If **any** displays, the policy is effective for every destination.
DSCP Code	This is the DSCP value of the incoming or outgoing packets to which this policy applies. **any** means all DSCP values or no DSCP marker. **default** means traffic with a DSCP value of 0. This is usually best effort traffic.
Service	This is the service object to which this policy applies. If **any** displays, the policy is effective for every service.
BWM In/Pri/Out/ Pri	This field shows the amount of bandwidth the traffic can use. **In** - This is how much inbound bandwidth, in kilobits per second, this policy allows the matching traffic to use. Inbound refers to the traffic the UAG sends to a connection's initiator. If **no** displays here, this policy does not apply bandwidth management for the inbound traffic. **Out** - This is how much outgoing bandwidth, in kilobits per second, this policy allows the matching traffic to use. Outbound refers to the traffic the UAG sends out from a connection's initiator. If **no** displays here, this policy does not apply bandwidth management for the outbound traffic. **Pri** - This is the priority for the incoming (the first **Pri** value) or outgoing (the second **Pri** value) traffic that matches this policy. The smaller the number, the higher the priority. Traffic with a higher priority is given bandwidth before traffic with a lower priority. The UAG ignores this number if the incoming and outgoing limits are both set to 0. In this case the traffic is automatically treated as being set to the lowest priority (7) regardless of this field's configuration.
DSCP Marking	This is how the UAG handles the DSCP value of the incoming and outgoing packets that match this policy. **preserve** means the UAG does not modify the DSCP value of the route's packets. **default** means the UAG sets the DSCP value of the route's packets to 0. If this field displays a DSCP value, the UAG applies that DSCP value to the route's packets. The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Section 11.4 on page 154 for more details.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

29.2.1 The Bandwidth Management Add/Edit Screen

The **Configuration > BWM Add/Edit** screen allows you to create a new condition or edit an existing one. To access this screen, go to the **Configuration > BWM** screen (see Section 29.2 on page 269), and click either the **Add** icon or an **Edit** icon.

Figure 188 Configuration > BWM > Edit (For the Default Policy)

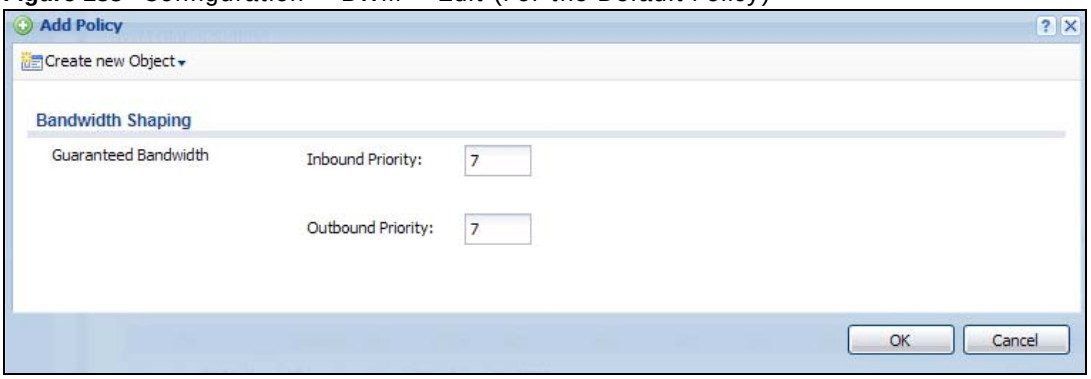
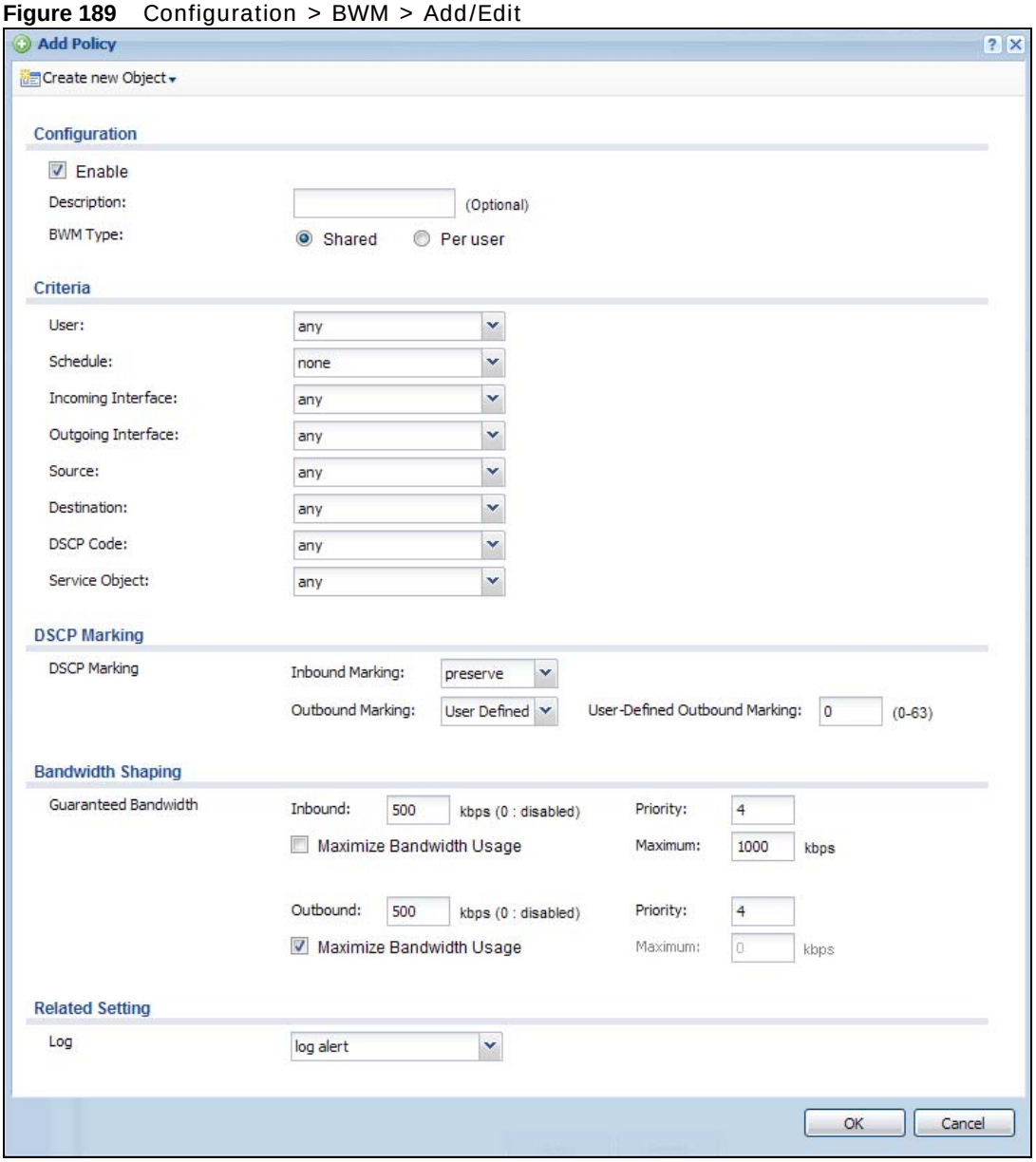


Figure 189 Configuration > BWM > Add/Edit



The following table describes the labels in this screen.

Table 135 Configuration > Bandwidth Management > Add/Edit

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable	Select this check box to turn on this policy.
Description	Enter a description of this policy. You can use alphanumeric and ()+/:=?!*#@$_%- characters, and it can be up to 60 characters long.
BWM Type	Select **Shared** to have users that match this policy to share the bandwidth configured in this policy. Select **Per user** to allow every user that matches this policy to use up to the bandwidth configured in this policy.
User	Select a user name or user group to which to apply the policy. Use **Create new Object** if you need to configure a new user account. Select **any** to apply the policy for every user.
Schedule	Select a schedule that defines when the policy applies or select **Create new Object** to configure a new one (see Chapter 34 on page 314 for details). Otherwise, select **none** to make the policy always effective.
Incoming Interface	Select the source interface of the traffic to which this policy applies.
Outgoing Interface	Select the destination interface of the traffic to which this policy applies.
Source	Select a source address or address group for whom this policy applies. Use **Create new Object** if you need to configure a new one. Select **any** if the policy is effective for every source.
Destination	Select a destination address or address group for whom this policy applies. Use **Create new Object** if you need to configure a new one. Select **any** if the policy is effective for every destination.
DSCP Code	Select a DSCP code point value of incoming or outgoing packets to which this policy applies or select **User Define** to specify another DSCP code point. The lower the number the higher the priority with the exception of 0 which is usually given only best-effort treatment. **any** means all DSCP value or no DSCP marker. **default** means traffic with a DSCP value of 0. This is usually best effort traffic. The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Section 11.4 on page 154 for more details.
User-Defined DSCP Code	Use this field to specify a custom DSCP code point.
Service Object	Select a service or service group to identify the type of traffic to which this policy applies.
DSCP Marking	Set how the UAG handles the DSCP value of the incoming and outgoing packets that match this policy.
Inbound Marking Outbound Marking	Inbound refers to the traffic the UAG sends to a connection's initiator. Outbound refers to the traffic the UAG sends out from a connection's initiator. Select one of the pre-defined DSCP values to apply or select **User Defined** to specify another DSCP value. The "**af**" choices stand for Assured Forwarding. The number following the "**af**" identifies one of four classes and one of three drop preferences. See Section 11.4 on page 154 for more details. Select **preserve** to have the UAG keep the packets' original DSCP value. Select **default** to have the UAG set the DSCP value of the packets to 0.

Table 135 Configuration > Bandwidth Management > Add/Edit

LABEL	DESCRIPTION
Bandwidth Shaping	Configure these fields to set the amount of bandwidth the matching traffic can use.
Inbound kbps	Type how much inbound bandwidth, in kilobits per second, this policy allows the traffic to use. Inbound refers to the traffic the UAG sends to a connection's initiator. If you enter **0** here, this policy does not apply bandwidth management for the matching traffic that the UAG sends to the initiator. Traffic with bandwidth management disabled (inbound and outbound are both set to 0) is automatically treated as the lowest priority (7). If the sum of the bandwidths for routes using the same next hop is higher than the actual transmission speed, lower priority traffic may not be sent if higher priority traffic uses all of the actual bandwidth.
Outbound kbps	Type how much outbound bandwidth, in kilobits per second, this policy allows the traffic to use. Outbound refers to the traffic the UAG sends out from a connection's initiator. If you enter **0** here, this policy does not apply bandwidth management for the matching traffic that the UAG sends out from the initiator. Traffic with bandwidth management disabled (inbound and outbound are both set to 0) is automatically treated as the lowest priority (7). If the sum of the bandwidths for routes using the same next hop is higher than the actual transmission speed, lower priority traffic may not be sent if higher priority traffic uses all of the actual bandwidth.
Priority	Enter a number between 1 and 7 to set the priority for traffic that matches this policy. The smaller the number, the higher the priority. Traffic with a higher priority is given bandwidth before traffic with a lower priority. The UAG uses a fairness-based (round-robin) scheduler to divide bandwidth between traffic flows with the same priority. The number in this field is ignored if the incoming and outgoing limits are both set to 0. In this case the traffic is automatically treated as being set to the lowest priority (7) regardless of this field's configuration.
Maximize Bandwidth Usage	This field displays when the inbound or outbound bandwidth management is not set to 0. Enable maximize bandwidth usage to let the traffic matching this policy "borrow" any unused bandwidth on the out-going interface. After each application or type of traffic gets its configured bandwidth rate, the UAG uses the fairness- based scheduler to divide any unused bandwidth on the out-going interface amongst applications and traffic types that need more bandwidth and have maximize bandwidth usage enabled.
Related Setting	
Log	Select whether to have the UAG generate a log (**log**), log and alert (**log alert**) or not (**no**) for packets that match the policy.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

30

User/Group

30.1 Overview

This chapter describes how to set up user accounts, user groups, and user settings for the UAG. You can also set up rules that control when users have to log in to the UAG before the UAG routes traffic for them.

30.1.1 What You Can Do in this Chapter

- The **User** screen (see Section 30.2 on page 277) provides a summary of all user accounts.
- The **Group** screen (see Section 30.3 on page 281) provides a summary of all user groups. In addition, this screen allows you to add, edit, and remove user groups. User groups may consist of access users and other user groups. You cannot put admin users in user groups
- The **Setting** screen (see Section 30.4 on page 282) controls default settings, login settings, lockout settings, and other user settings for the UAG. You can also use this screen to specify when users must log in to the UAG before it routes traffic for them.

30.1.2 What You Need To Know

User Account

A user account defines the privileges of a user logged into the UAG. User accounts are used in firewall rules, in addition to controlling access to configuration and services in the UAG.

User Types

These are the types of user accounts the UAG uses.

Table 136 Types of User Accounts

TYPE	ABILITIES	LOGIN METHOD(S)
Admin Users		
admin	Change UAG configuration (web, CLI)	WWW, TELNET, SSH, FTP, Console
limited-admin	Look at UAG configuration (web, CLI) Perform basic diagnostics (CLI)	WWW, TELNET, SSH, Console
Access Users		
ext-user	External user account	WWW
ext-group-user	External group user account	WWW
guest-manager	Create dynamic guest accounts	WWW
pre-subscriber	Access network services	Web Authentication Portal
dynamic-guest	Access network services	Web Authentication Portal

Note: The default **admin** account is always authenticated locally, regardless of the authentication method setting. (See Chapter 36 on page 322 for more information about authentication methods.)

Ext-User Accounts

Set up an **ext-user** account if the user is authenticated by an external server and you want to set up specific policies for this user in the UAG. If you do not want to set up policies for this user, you do not have to set up an **ext-user** account.

All **ext-user** users should be authenticated by an external server, such as RADIUS. If the UAG tries to use the local database to authenticate an **ext-user**, the authentication attempt always fails. (This is related to AAA servers and authentication methods, which are discussed in Chapter 35 on page 318 and Chapter 36 on page 322, respectively.)

Note: If the UAG tries to authenticate an **ext-user** using the local database, the attempt always fails.

Once an **ext-user** user has been authenticated, the UAG tries to get the user type (see Table 136 on page 275) from the external server. If the external server does not have the information, the UAG sets the user type for this session to **User**.

For the rest of the user attributes, such as reauthentication time, the UAG checks the following places, in order.

1. User account in the remote server.
2. User account (Ext-User) in the UAG.
3. Default user account for RADIUS users (**radius-users**) in the UAG.

See Setting up User Attributes in an External Server on page 287 for a list of attributes and how to set up the attributes in an external server.

Ext-Group-User Accounts

Ext-Group-User accounts are similar to ext-user accounts but allow you to group users by the value of the group membership attribute configured for the RADIUS server. See Section 35.2.1 on page 319 for more on the group membership attribute.

Dynamic-Guest Accounts

Dynamic guest accounts are guest accounts, but are created dynamically and stored in the UAG's local user database. A dynamic guest account has a dynamically-created user name and password. A dynamic guest account user can access the UAG's services only within a given period of time and will become invalid after the expiration date/time.

There are three types of dynamic guest accounts depending on how they are created or authenticated: **billing-users**, **ua-users** and **trial-users**.

billing-users are guest account created with the guest manager account or an external printer and paid by cash or created and paid via the on-line payment service. **ua-users** are users that log in

from the user agreement page. **trial-users** are free guest accounts that are created with the Free Time function.

Pre-Subscriber Accounts

Use the pre-subscriber account to test the Internet connection between the UAG and the ISP. The UAG does not impose time limitations or charges on this account. Thus, anyone who logs in with this account is able to gain Internet access for free.

User Groups

User groups may consist of user accounts or other user groups. Use user groups when you want to create the same rule for several user accounts, instead of creating separate rules for each one.

Note: You cannot put access users and admin users in the same user group.

Note: You cannot put the default **admin** account into any user group.

The sequence of members in a user group is not important.

User Awareness

By default, users do not have to log into the UAG to use the network services it provides. The UAG automatically routes packets for everyone. If you want to restrict network services that certain users can use via the UAG, you can require them to log in to the UAG first. The UAG is then 'aware' of the user who is logged in and you can create 'user-aware policies' that define what services they can use. See Section 30.4.2 on page 286 for a user-aware login example.

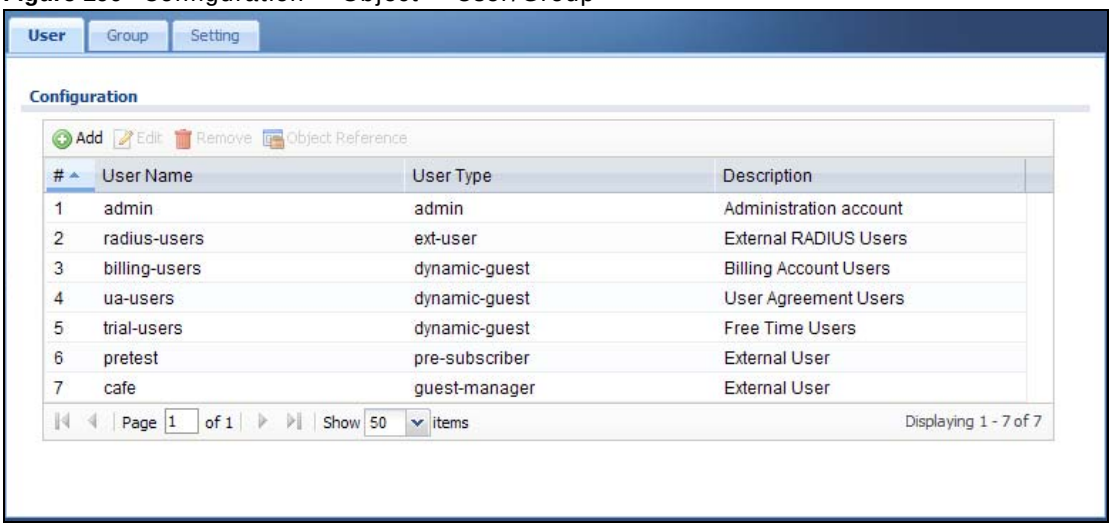
Finding Out More

- See Section 30.5 on page 287 for some information on users who use an external authentication server in order to log in.

30.2 User Summary Screen

The **User** screen provides a summary of all user accounts. To access this screen, login to the Web Configurator, and click **Configuration > Object > User/Group**.

Figure 190 Configuration > Object > User/Group



The following table describes the labels in this screen.

Table 137 Configuration > Object > User/Group

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific user.
User Name	This field displays the user name of each user.
User Type	This field displays the kind of account of each user. These are the kinds of user account the UAG supports. • **admin** - this user can look at and change the configuration of the UAG • **limited-admin** - this user can look at the configuration of the UAG but not to change it • **dynamic-guest** - this user has access to the UAG's services but cannot look at the configuration. • **ext-user** - this user account is maintained in a remote server, such as RADIUS. • **ext-group-user** - this user account is maintained in a remote server, such as RADIUS. • **guest-manager** - this user can log in via the web configurator login screen and create dynamic guest accounts using the **Account Generator** screen that pops up. See Section 25.3.1 on page 241 for detailed information about the **Account Generator** screen. • **pre-subscriber** - this user has access to the UAG's services but cannot look at the configuration.
Description	This field displays the description for each user.

30.2.1 User Add/Edit Screen

The **User Add/Edit** screen allows you to create a new user account or edit an existing one.

30.2.1.1 Rules for User Names

Enter a user name from 1 to 31 characters.

The user name can only contain the following characters:

- Alphanumeric A-z 0-9 (there is no unicode support)
- _ [underscores]
- - [dashes]

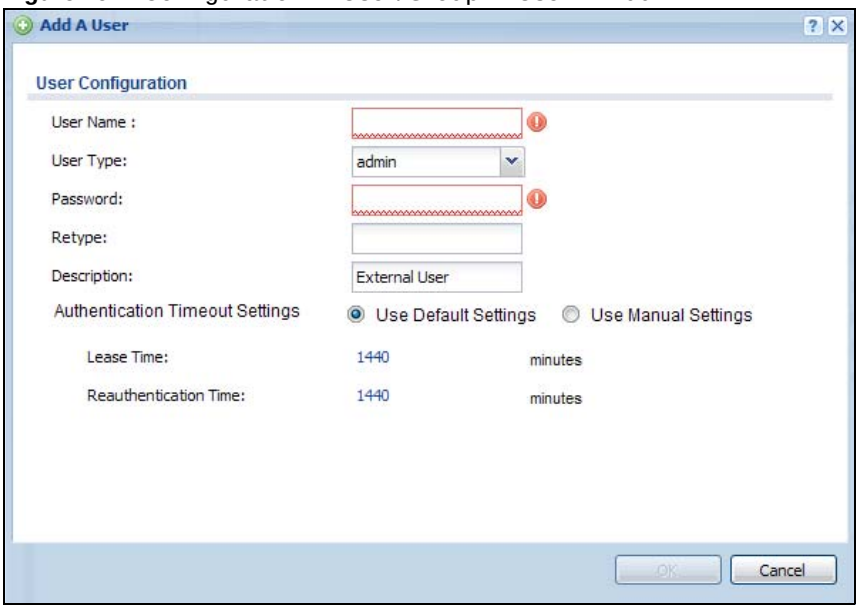
The first character must be alphabetical (A-Z a-z), an underscore (_), or a dash (-). Other limitations on user names are:

- User names are case-sensitive. If you enter a user 'bob' but use 'BOB' when connecting via CIFS or FTP, it will use the account settings used for 'BOB' not ‘bob’.
- User names have to be different than user group names.
- Here are the reserved user names:

• adm	• admin	• any	• bin	• daemon
• debug	• devicehaecived	• ftp	• games	• halt
• ldap-users	• lp	• mail	• news	• nobody
• operator	• radius-users	• root	• shutdown	• sshd
• sync	• uucp	• zyxel		

To access this screen, go to the **User** screen (see Section 30.2 on page 277), and click either the **Add** icon or an **Edit** icon.

Figure 191 Configuration > User/Group > User > Add



The following table describes the labels in this screen.

Table 138 Configuration > User/Group > User > Add

LABEL	DESCRIPTION
User Name	Type the user name for this user account. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. User names have to be different than user group names, and some words are reserved. See Section 30.2.1.1 on page 279.
User Type	This field displays the types of user accounts the UAG uses: • **admin** - this user can look at and change the configuration of the UAG • **limited-admin** - this user can look at the configuration of the UAG but not to change it • **ext-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-User Accounts on page 276 for more information about this type. • **ext-group-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-Group-User Accounts on page 276 for more information about this type. • **guest-manager** - this user can log in via the web configurator login screen and create dynamic guest accounts using the **Account Generator** screen that pops up. See Section 25.3.1 on page 241 for detailed information about the **Account Generator** screen. • **pre-subscriber** - this user has access to the UAG's services but cannot look at the configuration.
Password	This field is not available if you select the **ext-user** or **ext-group-user** type. Enter the password of this user account. It can consist of 4 - 31 alphanumeric characters.
Retype	This field is not available if you select the **ext-user** or **ext-group-user** type.
Group Identifier	This field is available for a **ext-group-user** type user account. Specify the value of the RADIUS server's **Group Membership Attribute** that identifies the group to which this user belongs.
Associated AAA Server Object	This field is available for a **ext-group-user** type user account. Select the AAA server to use to authenticate this account's users.
Description	Enter the description of each user, if any. You can use up to 60 printable ASCII characters. Default descriptions are provided.
Authentication Timeout Settings	If you want the system to use default settings, select **Use Default Settings**. If you want to set authentication timeout to a value other than the default settings, select **Use Manual Settings** then fill your preferred values in the fields that follow.
Lease Time	If you select **Use Default Settings** in the **User Settings** field, the default lease time is shown. If you select **Use Manual Settings**, you need to enter the number of minutes this user has to renew the current session before the user is logged out. You can specify 1 to 1440 minutes. You can enter 0 to make the number of minutes unlimited. Admin users renew the session every time the main screen refreshes in the Web Configurator. Access users can renew the session by clicking the **Renew** button on their screen. If you allow access users to renew time automatically (see Section 30.4 on page 282), the users can select this check box on their screen as well. In this case, the session is automatically renewed before the lease time expires.
Reauthentication Time	If you select **Use Default Settings** in the **User Settings** field, the default lease time is shown. If you select **Use Manual Settings**, you need to type the number of minutes this user can be logged into the UAG in one session before the user has to log in again. You can specify 1 to 1440 minutes. You can enter 0 to make the number of minutes unlimited. Unlike **Lease Time**, the user has no opportunity to renew the session without logging out.

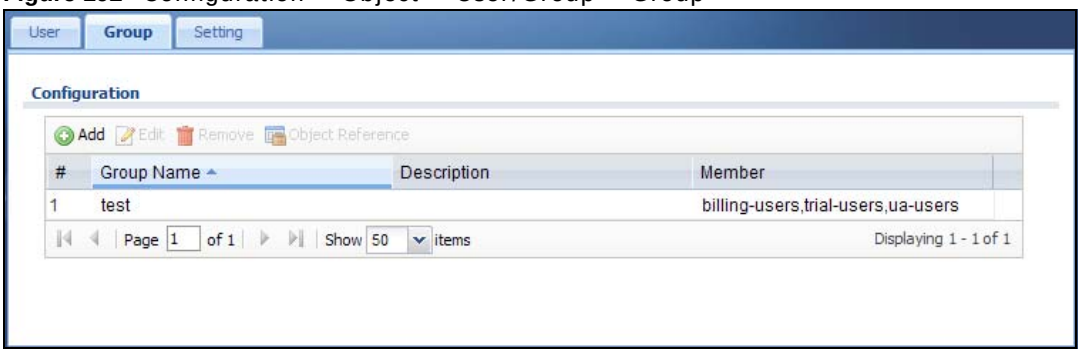
Table 138 Configuration > User/Group > User > Add (continued)

LABEL	DESCRIPTION
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

30.3 User Group Summary Screen

User groups consist of access users and other user groups. You cannot put admin users in user groups. The **Group** screen provides a summary of all user groups. In addition, this screen allows you to add, edit, and remove user groups. To access this screen, login to the Web Configurator, and click **Configuration > Object > User/Group > Group**.

Figure 192 Configuration > Object > User/Group > Group



The following table describes the labels in this screen. See Section 30.3.1 on page 281 for more information as well.

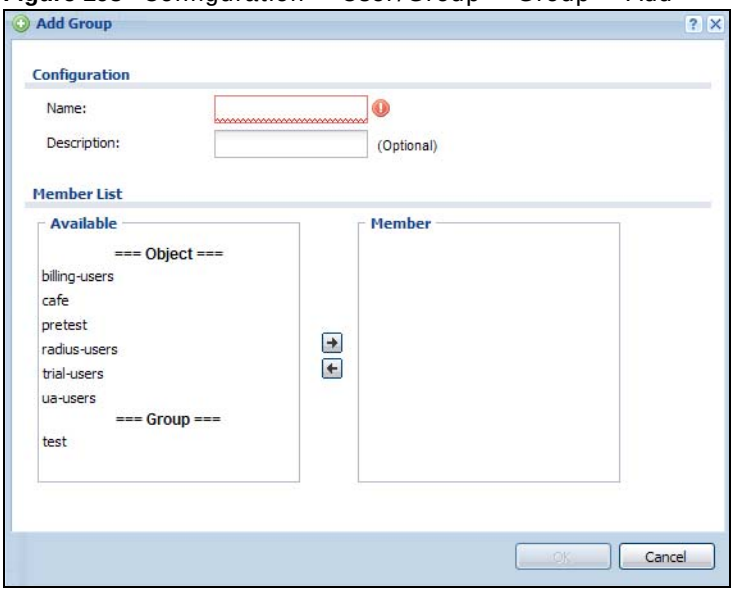
Table 139 Configuration > Object > User/Group > Group

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Removing a group does not remove the user accounts in the group.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific user group.
Group Name	This field displays the name of each user group.
Description	This field displays the description for each user group.
Member	This field lists the members in the user group. Each member is separated by a comma.

30.3.1 Group Add/Edit Screen

The **Group Add/Edit** screen allows you to create a new user group or edit an existing one. To access this screen, go to the **Group** screen (see Section 30.3 on page 281), and click either the **Add** icon or an **Edit** icon.

Figure 193 Configuration > User/Group > Group > Add



The following table describes the labels in this screen.

Table 140 Configuration > User/Group > Group > Add

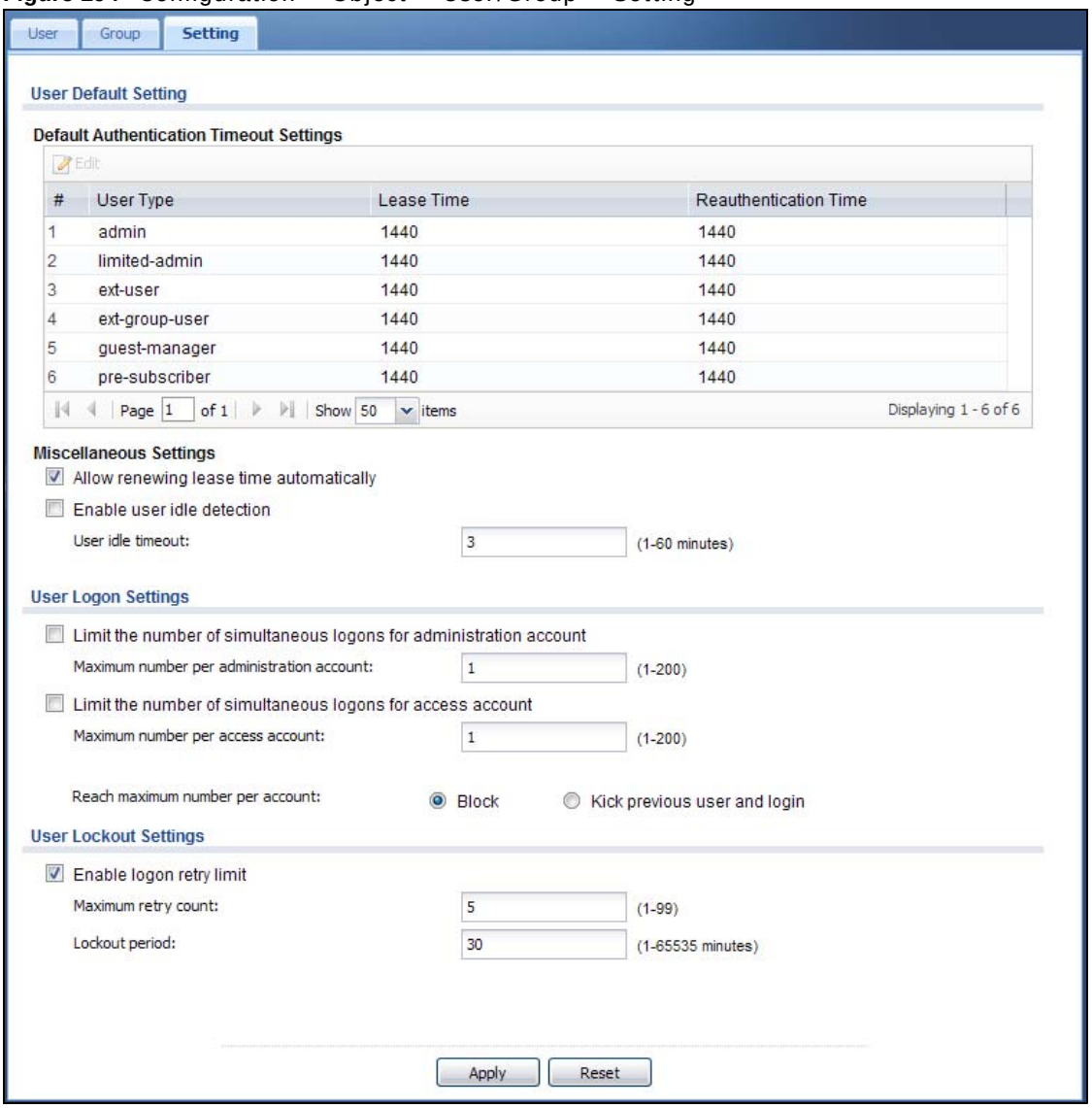
LABEL	DESCRIPTION
Name	Type the name for this user group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. User group names have to be different than user names.
Description	Enter the description of the user group, if any. You can use up to 60 characters, punctuation marks, and spaces.
Member List	The **Member** list displays the names of the users and user groups that have been added to the user group. The order of members is not important. Select users and groups from the **Available** list that you want to be members of this group and move them to the **Member** list. You can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entries and use the arrow button to move them. Move any members you do not want included to the **Available** list.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

30.4 The User/Group Setting Screen

The **Setting** screen controls default settings, login settings, lockout settings, and other user settings for the UAG. You can also use this screen to specify when users must log in to the UAG before it routes traffic for them.

To access this screen, login to the Web Configurator, and click **Configuration > Object > User/Group > Setting**.

Figure 194 Configuration > Object > User/Group > Setting



The following table describes the labels in this screen.

Table 141 Configuration > Object > User/Group > Setting

LABEL	DESCRIPTION
User Default Setting	
Default Authentication Timeout Settings	These authentication timeout settings are used by default when you create a new user account. They also control the settings for any existing user accounts that are set to use the default settings. You can still manually configure any user account's authentication timeout settings.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
#	This field is a sequential value, and it is not associated with a specific entry.

Table 141 Configuration > Object > User/Group > Setting (continued)

LABEL	DESCRIPTION
User Type	These are the kinds of user account the UAG supports. • **admin** - this user can look at and change the configuration of the UAG • **limited-admin** - this user can look at the configuration of the UAG but not to change it • **ext-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-User Accounts on page 276 for more information about this type. • **ext-group-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-Group-User Accounts on page 276 for more information about this type. • **guest-manager** - this user can log in via the web configurator login screen and create dynamic guest accounts using the **Account Generator** screen that pops up. • **pre-subscriber** - this user has access to the UAG's services but cannot look at the configuration.
Lease Time	This is the default lease time in minutes for each type of user account. It defines the number of minutes the user has to renew the current session before the user is logged out. Admin users renew the session every time the main screen refreshes in the Web Configurator. Access users can renew the session by clicking the **Renew** button on their screen. If you allow access users to renew time automatically (see Section 30.4 on page 282), the users can select this check box on their screen as well. In this case, the session is automatically renewed before the lease time expires.
Reauthentication Time	This is the default reauthentication time in minutes for each type of user account. It defines the number of minutes the user can be logged into the UAG in one session before having to log in again. Unlike **Lease Time**, the user has no opportunity to renew the session without logging out.
Miscellaneous Settings	
Allow renewing lease time automatically	Select this check box if access users can renew lease time automatically, as well as manually, simply by selecting the **Updating lease time automatically** check box on their screen.
Enable user idle detection	This is applicable for access users. Select this check box if you want the UAG to monitor how long each access user is logged in and idle (in other words, there is no traffic for this access user). The UAG automatically logs out the access user once the **User idle timeout** has been reached.
User idle timeout	This is applicable for access users. This field is effective when **Enable user idle detection** is checked. Type the number of minutes each access user can be logged in and idle before the UAG automatically logs out the access user.
User Logon Settings	
Limit number of simultaneous logons for administration account	Select this check box if you want to set a limit on the number of simultaneous logins by admin users. If you do not select this, admin users can log in as many times as they want at the same time using the same or different IP addresses.
Maximum number per administration account	This field is effective when **Limit number of simultaneous logons for administration account** is checked. Type the maximum number of simultaneous logins by each admin user.
Limit number of simultaneous logons for access account	Select this check box if you want to set a limit on the number of simultaneous logins by non-admin users. If you do not select this, access users can log in as many times as they want as long as they use different IP addresses.
Maximum number per access account	This field is effective when **Limit number of simultaneous logons for access account** is checked. Type the maximum number of simultaneous logins by each access user.

Table 141 Configuration > Object > User/Group > Setting (continued)

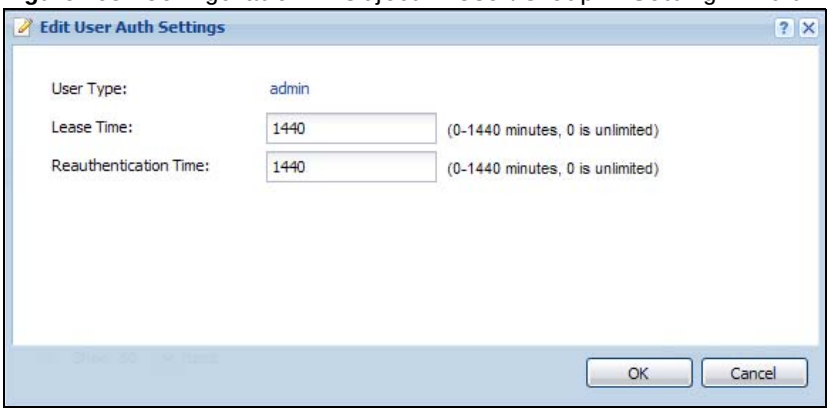
LABEL	DESCRIPTION
Reach maximum number per account	Select **Block** to stop new users from logging in when the **Maximum number per access account** is reached. Select **Kick previous user and login** to disassociate the first user that logged in and allow new user to log in when the **Maximum number per access account** is reached.
User Lockout Settings	
Enable logon retry limit	Select this check box to set a limit on the number of times each user can login unsuccessfully (for example, wrong password) before the IP address is locked out for a specified amount of time.
Maximum retry count	This field is effective when **Enable logon retry limit** is checked. Type the maximum number of times each user can login unsuccessfully before the IP address is locked out for the specified **Lockout period**. The number must be between 1 and 99.
Lockout period	This field is effective when **Enable logon retry limit** is checked. Type the number of minutes the user must wait to try to login again, if logon retry limit is enabled and the **Maximum retry count** is reached. This number must be between 1 and 65,535 (about 45.5 days).
Apply	Click **Apply** to save the changes.
Reset	Click **Reset** to return the screen to its last-saved settings.

30.4.1 Default User Settings Edit Screens

The **Edit User Default Settings** screen allows you to set the default authentication timeout settings for the selected type of user account. These default authentication timeout settings also control the settings for any existing user accounts that are set to use the default settings. You can still manually configure any user account's authentication timeout settings.

To access this screen, go to the **Configuration > Object > User/Group > Setting** screen (see Section 30.4 on page 282), and select one of the **Default Settings** section's entry and click the **Edit** icons.

Figure 195 Configuration > Object > User/Group > Setting > Edit



The following table describes the labels in this screen.

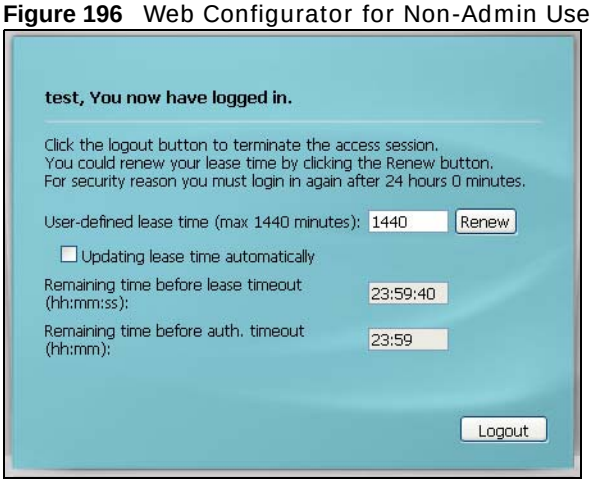
Table 142 Configuration > Object > User/Group > Setting > Edit

LABEL	DESCRIPTION
User Type	This read-only field identifies the type of user account for which you are configuring the default settings. • **admin** - this user can look at and change the configuration of the UAG • **limited-admin** - this user can look at the configuration of the UAG but not to change it. • **ext-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-User Accounts on page 276 for more information about this type. • **ext-group-user** - this user account is maintained in a remote server, such as RADIUS. See Ext-Group-User Accounts on page 276 for more information about this type. • **guest-manager** - this user can log in via the web configurator login screen and create dynamic guest accounts using the **Account Generator** screen that pops up. • **pre-subscriber** - this user has access to the UAG's services but cannot look at the configuration.
Lease Time	Enter the number of minutes this type of user account has to renew the current session before the user is logged out. You can specify 1 to 1440 minutes. You can enter 0 to make the number of minutes unlimited. Admin users renew the session every time the main screen refreshes in the Web Configurator. Access users can renew the session by clicking the **Renew** button on their screen. If you allow access users to renew time automatically (see Section 30.4 on page 282), the users can select this check box on their screen as well. In this case, the session is automatically renewed before the lease time expires.
Reauthentication Time	Select this option and type the number of minutes this type of user account can be logged into the UAG in one session before the user has to log in again. You can specify 1 to 1440 minutes. You can enter 0 to make the number of minutes unlimited. Unlike **Lease Time**, the user has no opportunity to renew the session without logging out.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

30.4.2 User Aware Login Example

Access users cannot use the Web Configurator to browse the configuration of the UAG. Instead, after access users log into the UAG, the following screen appears.

Figure 196 Web Configurator for Non-Admin Users



The following table describes the labels in this screen.

Table 143 Web Configurator for Non-Admin Users

LABEL	DESCRIPTION
User-defined lease time (max ... minutes)	Access users can specify a lease time shorter than or equal to the one that you specified. The default value is the lease time that you specified.
Renew	Access users can click this button to reset the lease time, the amount of time remaining before the UAG automatically logs them out. The UAG sets this amount of time according to the • **User-defined lease time** field in this screen • **Lease time** field in the **User Add/Edit** screen (see Section 30.2.1 on page 278) • **Lease time** field in the **Setting > Edit** screen (see Section 30.4 on page 282)
Updating lease time automatically	This box appears if you checked the **Allow renewing lease time automatically** box in the **Setting** screen. (See Section 30.4 on page 282.) Access users can select this check box to reset the lease time automatically 30 seconds before it expires. Otherwise, access users have to click the **Renew** button to reset the lease time.
Remaining time before lease timeout	This field displays the amount of lease time that remains, though the user might be able to reset it.
Remaining time before auth. timeout	This field displays the amount of time that remains before the UAG automatically logs the access user out, regardless of the lease time.

30.5 User /Group Technical Reference

This section provides some information on users who use an external authentication server in order to log in.

Setting up User Attributes in an External Server

To set up user attributes, such as reauthentication time, in RADIUS servers, use the following keywords in the user configuration file.

Table 144 RADIUS: Keywords for User Attributes

KEYWORD	CORRESPONDING ATTRIBUTE IN WEB CONFIGURATOR
type	**User Type**. Possible Values: admin, limited-admin, pre-subscriber, dynamic-guest.
leaseTime	**Lease Time**. Possible Values: 1-1440 (minutes).
reauthTime	**Reauthentication Time**. Possible Values: 1-1440 (minutes).

The following example shows you how you might set up user attributes in RADIUS servers.

Figure 197 RADIUS Example: Keywords for User Attributes

```
type=user;leaseTime=222;reauthTime=222
```

Creating a Large Number of Ext-User Accounts

If you plan to create a large number of **Ext-User** accounts, you might use CLI commands, instead of the Web Configurator, to create the accounts. Extract the user names from the RADIUS server, and create a shell script that creates the user accounts. See Chapter 41 on page 400 for more information about shell scripts.

31

AP Profile

31.1 Overview

This chapter shows you how to configure preset profiles for the Access Points (APs) connected to your UAG's wireless network.

31.1.1 What You Can Do in this Chapter

- The **Radio** screen (Section 31.2 on page 290) creates radio configurations that can be used by the APs.
- The **SSID** screen (Section 31.3 on page 295) configures three different types of profiles for your networked APs.

31.1.2 What You Need To Know

The following terms and concepts may help as you read this chapter.

Wireless Profiles

At the heart of all wireless AP configurations on the UAG are profiles. A profile represents a group of saved settings that you can use across any number of connected APs. You can set up the following wireless profile types:

- **Radio** - This profile type defines the properties of an AP's radio transmitter. You can have a maximum of 32 radio profiles on the UAG.
- **SSID** - This profile type defines the properties of a single wireless network signal broadcast by an AP. Each radio on a single AP can broadcast up to 8 SSIDs. You can have a maximum of 32 SSID profiles on the UAG.
- **Security** - This profile type defines the security settings used by a single SSID. It controls the encryption method required for a wireless client to associate itself with the SSID. You can have a maximum of 32 security profiles on the UAG.
- **MAC Filtering** - This profile provides an additional layer of security for an SSID, allowing you to block access or allow access to that SSID based on wireless client MAC addresses. If a client's MAC address is on the list, then it is either allowed or denied, depending on how you set up the MAC Filter profile. You can have a maximum of 32 MAC filtering profiles on the UAG.

SSID

The SSID (Service Set IDentifier) is the name that identifies the Service Set with which a wireless station is associated. Wireless stations associating to the access point (AP) must have the same SSID. In other words, it is the name of the wireless network that clients use to connect to it.

WEP

WEP (Wired Equivalent Privacy) encryption scrambles all data packets transmitted between the AP and the wireless stations associated with it in order to keep network communications private. Both the wireless stations and the access points must use the same WEP key for data encryption and decryption.

WPA and WPA2

Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. WPA2 (IEEE 802.11i) is a wireless security standard that defines stronger encryption, authentication and key management than WPA. Key differences between WPA(2) and WEP are improved data encryption and user authentication.

IEEE 802.1x

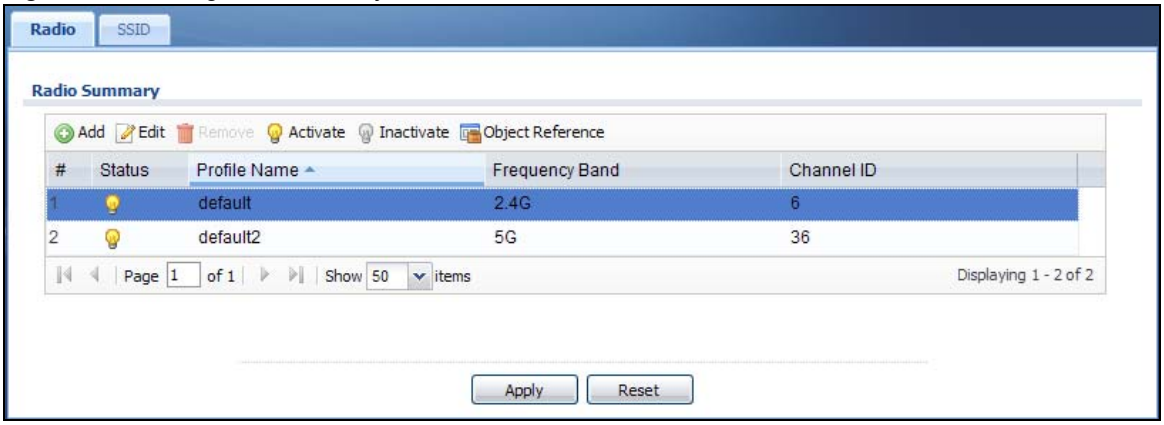
The IEEE 802.1x standard outlines enhanced security methods for both the authentication of wireless stations and encryption key management. Authentication is done using an external RADIUS server.

31.2 Radio Screen

This screen allows you to create radio profiles for the APs on your network. A radio profile is a list of settings that a supported managed AP (NWA5121-N for example) can use to configure either one of its two radio transmitters. To access this screen click **Configuration > Object > AP Profile**.

Note: You can have a maximum of 32 radio profiles on the UAG.

Figure 198 Configuration > Object > AP Profile > Radio



The following table describes the labels in this screen.

Table 145 Configuration > Object > AP Profile > Radio

LABEL	DESCRIPTION
Add	Click this to add a new radio profile.
Edit	Click this to edit the selected radio profile.
Remove	Click this to remove the selected radio profile.

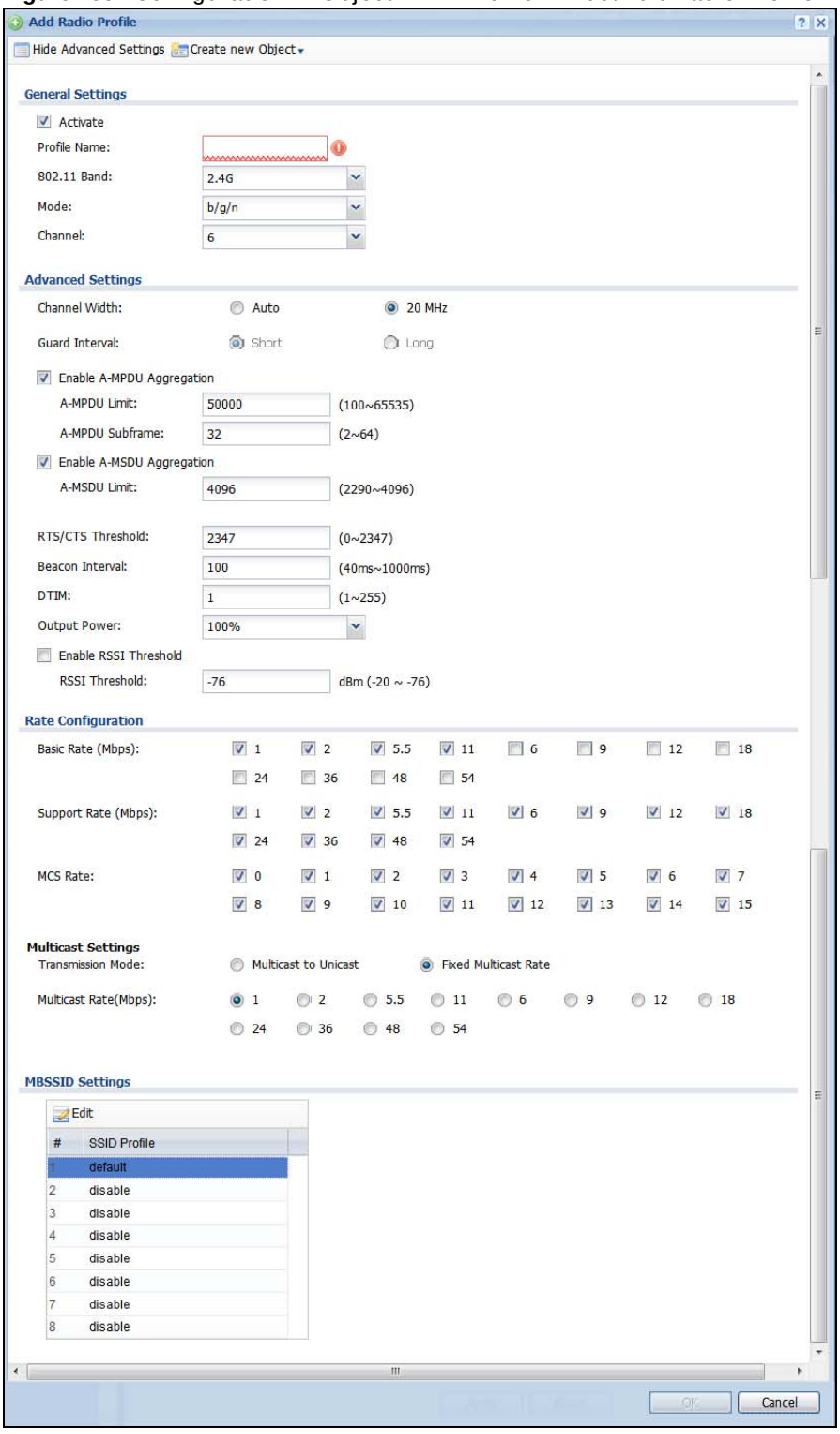
Table 145 Configuration > Object > AP Profile > Radio (continued)

LABEL	DESCRIPTION
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Object Reference	Click this to view which other objects are linked to the selected radio profile.
#	This field is a sequential value, and it is not associated with a specific profile.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Profile Name	This field indicates the name assigned to the radio profile.
Frequency Band	This field indicates the frequency band which this radio profile is configured to use.
Channel ID	This field indicates the broadcast channel which this radio profile is configured to use.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

31.2.1 Add/Edit Radio Profile

This screen allows you to create a new radio profile or edit an existing one. To access this screen, click the **Add** button or select a radio profile from the list and click the **Edit** button.

Figure 199 Configuration > Object > AP Profile > Add/Edit Radio Profile



The following table describes the labels in this screen.

Table 146 Configuration > Object > AP Profile > Add/Edit Radio Profile

LABEL	DESCRIPTION
Hide / Show Advanced Settings	Click this to hide or show the **Advanced Settings** in this window.
Create New Object	Select an item from this menu to create a new object of that type. Any objects created in this way are automatically linked to this radio profile.
General Settings	
Activate	Select this option to make this profile active.
Profile Name	Enter up to 31 alphanumeric characters to be used as this profile's name. Spaces and underscores are allowed.
802.11 Band	Select the wireless band which this radio profile should use. 2.4 GHz is the frequency used by IEEE 802.11b/g/n wireless clients. 5 GHz is the frequency used by IEEE 802.11a/n wireless clients.
Mode	Select how to let wireless clients connect to the AP. When using the 2.4 GHz band, select **b/g** to let IEEE 802.11b and IEEE 802.11g compliant WLAN devices associate with the AP. When using the 2.4 GHz band, select **b/g/n** to let IEEE 802.11b, IEEE 802.11g, and IEEE 802.11n compliant WLAN devices associate with the AP. When using the 5 GHz band, select **a** to let only IEEE 802.11a compliant WLAN devices associate with the AP. When using the 5 GHz band, select **a/n** to let IEEE 802.11a and IEEE 802.11n compliant WLAN devices associate with the AP.
Channel	Select the wireless channel which this radio profile should use. It is recommended that you choose the channel least in use by other APs in the region where this profile will be implemented. This will reduce the amount of interference between wireless clients and the AP to which this profile is assigned. Some 5 GHz channels include the label **indoor use only**. These are for use with an indoor AP only. Do not use them with an outdoor AP.
Advanced Settings	
Channel Width	Select the channel bandwidth you want to use for your wireless network. Select **Auto** to allow the UAG to adjust the channel bandwidth to 40 MHz or 20 MHz depending on network conditions. Select **20 MHz** if you want to lessen radio interference with other wireless devices in your neighborhood.
Guard Interval	Set the guard interval for this radio profile to either **short** or **long**. The guard interval is the gap introduced between data transmission from users in order to reduce interference. Reducing the interval increases data transfer rates but also increases interference. Increasing the interval reduces data transfer rates but also reduces interference.
Enable A-MPDU Aggregation	Select this to enable A-MPDU aggregation. Message Protocol Data Unit (MPDU) aggregation collects Ethernet frames along with their 802.11n headers and wraps them in a 802.11n MAC header. This method is useful for increasing bandwidth throughput in environments that are prone to high error rates.
A-MPDU Limit	Enter the maximum frame size to be aggregated.

Table 146 Configuration > Object > AP Profile > Add/Edit Radio Profile (continued)

LABEL	DESCRIPTION
A-MPDU Subframe	Enter the maximum number of frames to be aggregated each time.
Enable A-MSDU Aggregation	Select this to enable A-MSDU aggregation. Mac Service Data Unit (MSDU) aggregation collects Ethernet frames without any of their 802.11n headers and wraps the header-less payload in a single 802.11n MAC header. This method is useful for increasing bandwidth throughput. It is also more efficient than A-MPDU except in environments that are prone to high error rates.
A-MSDU Limit	Enter the maximum frame size to be aggregated.
Disable-Channel Switch for DFS	This field is available when you select **5G** in the **802.11 Band** field. DFS (dynamic frequency selection) allows an AP to detect other devices in the same channel. If there is another device using the same channel, the AP changes to a different channel, so that it can avoid interference with radar systems or other wireless networks. Select this option to disable DFS on the AP.
RTS/CTS Threshold	Use RTS/CTS to reduce data collisions on the wireless network if you have wireless clients that are associated with the same AP but out of range of one another. When enabled, a wireless client sends an RTS (Request To Send) and then waits for a CTS (Clear To Send) before it transmits. This stops wireless clients from transmitting packets at the same time (and causing data collisions). A wireless client sends an RTS for all packets larger than the number (of bytes) that you enter here. Set the RTS/CTS equal to or higher than the fragmentation threshold to turn RTS/CTS off.
Beacon Interval	When a wirelessly networked device sends a beacon, it includes with it a beacon interval. This specifies the time period before the device sends the beacon again. The interval tells receiving devices on the network how long they can wait in low-power mode before waking up to handle the beacon. A high value helps save current consumption of the access point.
DTIM	Delivery Traffic Indication Message (DTIM) is the time period after which broadcast and multicast packets are transmitted to mobile clients in the Active Power Management mode. A high DTIM value can cause clients to lose connectivity with the network. This value can be set from 1 to 255.
Output Power	Set the output power of the AP in this field. If there is a high density of APs in an area, decrease the output power of the NWA5160N to reduce interference with other APs. Select one of the following **100%**, **50%**, **25%**, or **12.5%**. See the product specifications for more information on your UAG's output power. Note: Reducing the output power also reduces the UAG's effective broadcast radius.
Enable RSSI Threshold	Use the Received Signal Strength Indication (RSSI) threshold to ensure wireless clients receive good throughput. This allows only wireless clients with a strong signal to connect to the AP. Select the check box and set a minimum client signal strength for connecting to the AP. -20 dBm is the strongest signal you can require and -76 is the weakest. Clear the check box to not require wireless clients to have a minimum signal strength to connect to the AP.

Table 146 Configuration > Object > AP Profile > Add/Edit Radio Profile (continued)

LABEL	DESCRIPTION
Rate Configuration	This section controls the data rates permitted for clients. For each **Rate**, select a rate option from its list. The rates are: • **Basic Rate (Mbps)** - Set the basic rate configuration in Mbps. • **Support Rate (Mbps)** - Set the support rate configuration in Mbps. • **MCS Rate** - Set the MCS rate configuration. IEEE 802.11n supports many different data rates which are called MCS rates. MCS stands for Modulation and Coding Scheme. This is an 802.11n feature that increases the wireless network performance in terms of throughput.
Multicast Settings	Use this section to set a transmission mode and maximum rate for multicast traffic.
Transmission Mode	Set how the AP handles multicast traffic. Select **Multicast to Unicast** to broadcast wireless multicast traffic to all of the wireless clients as unicast traffic. Unicast traffic dynamically changes the data rate based on the application's bandwidth requirements. The retransmit mechanism of unicast traffic provides more reliable transmission of the multicast traffic, although it also produces duplicate packets. Select **Fixed Multicast Rate** to send wireless multicast traffic at a single data rate. You must know the multicast application's bandwidth requirements and set it in the following field.
Multicast Rate (Mbps)	If you set the multicast transmission mode to fixed multicast rate, set the data rate for multicast traffic here. For example, to deploy 4 Mbps video, select a fixed multicast rate higher than 4 Mbps.
MBSSID Settings	This section allows you to associate an SSID profile with the radio profile.
Edit	Select and SSID and click this button to reassign it. The selected SSID becomes editable immediately upon clicking.
SSID Profile	Indicates which SSID profile is associated with this radio profile.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

31.3 SSID Screen

The SSID screens allow you to configure three different types of profiles for your networked APs: an SSID list, which can assign specific SSID configurations to your APs; a security list, which can assign specific encryption methods to the APs when allowing wireless clients to connect to them; and a MAC filter list, which can limit connections to an AP based on wireless clients MAC addresses.

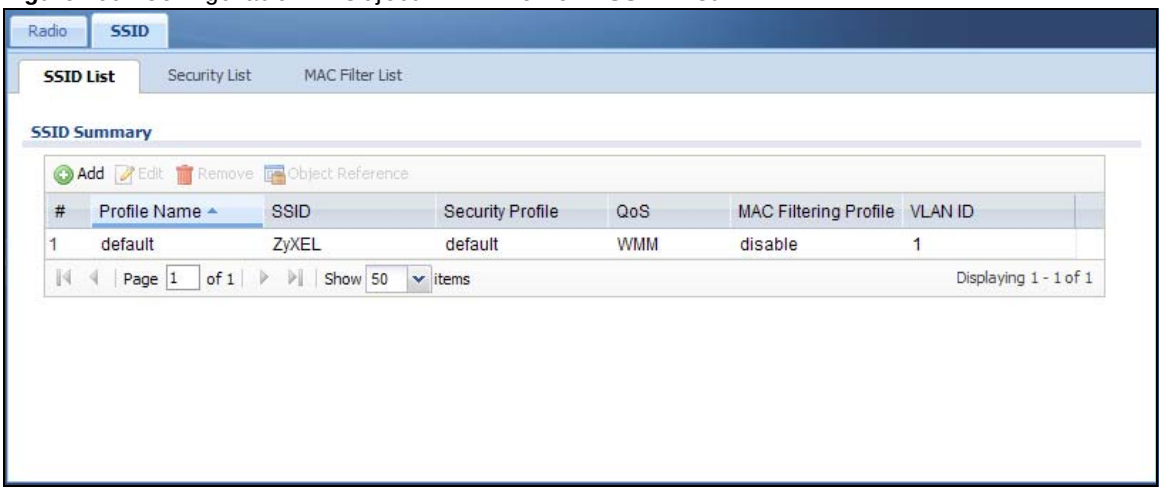
31.3.1 SSID List

This screen allows you to create and manage SSID configurations that can be used by the APs. An SSID, or Service Set IDentifier, is basically the name of the wireless network to which a wireless client can connect. The SSID appears as readable text to any device capable of scanning for wireless frequencies (such as the WiFi adapter in a laptop), and is displayed as the wireless network name when a person makes a connection to it.

To access this screen click **Configuration > Object > AP Profile > SSID**.

Note: You can have a maximum of 32 SSID profiles on the UAG.

Figure 200 Configuration > Object > AP Profile > SSID List



The following table describes the labels in this screen.

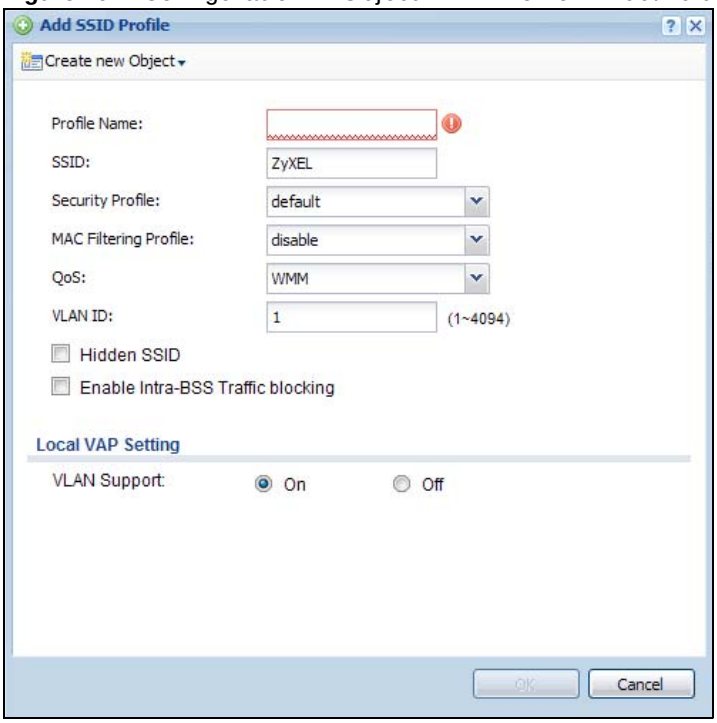
Table 147 Configuration > Object > AP Profile > SSID List

LABEL	DESCRIPTION
Add	Click this to add a new SSID profile.
Edit	Click this to edit the selected SSID profile.
Remove	Click this to remove the selected SSID profile.
Object Reference	Click this to view which other objects are linked to the selected SSID profile (for example, radio profile).
#	This field is a sequential value, and it is not associated with a specific profile.
Profile Name	This field indicates the name assigned to the SSID profile.
SSID	This field indicates the SSID name as it appears to wireless clients.
Security Profile	This field indicates which (if any) security profile is associated with the SSID profile.
QoS	This field indicates the QoS type associated with the SSID profile.
MAC Filtering Profile	This field indicates which (if any) MAC Filter Profile is associated with the SSID profile.
VLAN ID	This field indicates the VLAN ID associated with the SSID profile.

31.3.2 Add/Edit SSID Profile

This screen allows you to create a new SSID profile or edit an existing one. To access this screen, click the **Add** button or select an SSID profile from the list and click the **Edit** button.

Figure 201 Configuration > Object > AP Profile > Add/Edit SSID Profile



The following table describes the labels in this screen.

Table 148 Configuration > Object > AP Profile > Add/Edit SSID Profile

LABEL	DESCRIPTION
Create new Object	Select an object type from the list to create a new one associated with this SSID profile.
Profile Name	Enter up to 31 alphanumeric characters for the profile name. This name is only visible in the Web Configurator and is only for management purposes. Spaces and underscores are allowed.
SSID	Enter the SSID name for this profile. This is the name visible on the network to wireless clients. Enter up to 32 characters, spaces and underscores are allowed.
Security Profile	Select a security profile from this list to associate with this SSID. If none exist, you can use the **Create new Object** menu to create one. Note: It is highly recommended that you create security profiles for all of your SSIDs to enhance your network security.
MAC Filtering Profile	Select a MAC filtering profile from the list to associate with this SSID. If none exist, you can sue the **Create new Object** menu to create one. MAC filtering allows you to limit the wireless clients connecting to your network through a particular SSID by wireless client MAC addresses. Any clients that have MAC addresses not in the MAC filtering profile of allowed addresses are denied connections. The **disable** setting means no MAC filtering is used.

Table 148 Configuration > Object > AP Profile > Add/Edit SSID Profile (continued)

LABEL	DESCRIPTION
QoS	Select a Quality of Service (QoS) access category to associate with this SSID. Access categories minimize the delay of data packets across a wireless network. Certain categories, such as video or voice, are given a higher priority due to the time sensitive nature of their data packets. QoS access categories are as follows: **disable**: Turns off QoS for this SSID. All data packets are treated equally and not tagged with access categories. **WMM**: Enables automatic tagging of data packets. The UAG assigns access categories to the SSID by examining data as it passes through it and making a best guess effort. If something looks like video traffic, for instance, it is tagged as such. **WMM_VOICE**: All wireless traffic to the SSID is tagged as voice data. This is recommended if an SSID is used for activities like placing and receiving VoIP phone calls. **WMM_VIDEO**: All wireless traffic to the SSID is tagged as video data. This is recommended for activities like video conferencing. **WMM_BEST_EFFORT**: All wireless traffic to the SSID is tagged as “best effort,” meaning the data travels the best route it can without displacing higher priority traffic. This is good for activities that do not require the best bandwidth throughput, such as surfing the Internet. **WMM_BACKGROUND**: All wireless traffic to the SSID is tagged as low priority or “background traffic”, meaning all other access categories take precedence over this one. If traffic from an SSID does not have strict throughput requirements, then this access category is recommended. For example, an SSID that only has network printers connected to it.
VLAN ID	Enter the VLAN ID that will be used to tag all traffic originating from this SSID if the VLAN is different from the native VLAN.
Hidden SSID	Select this if you want to “hide” your SSID from wireless clients. This tells any wireless clients in the vicinity of the AP using this SSID profile not to display its SSID name as a potential connection. Not all wireless clients respect this flag and display it anyway. When an SSID is “hidden” and a wireless client cannot see it, the only way you can connect to the SSID is by manually entering the SSID name in your wireless connection setup screen(s) (these vary by client, client connectivity software, and operating system).
Enable Intra-BSS Traffic Blocking	Select this option to prevent crossover traffic from within the same SSID.
Local VAP Setting	
VLAN Support	Select **ON** to tag traffic from the local Virtual AP (VAP) with the VLAN ID specified in this SSID profile. Otherwise, select **Off**.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

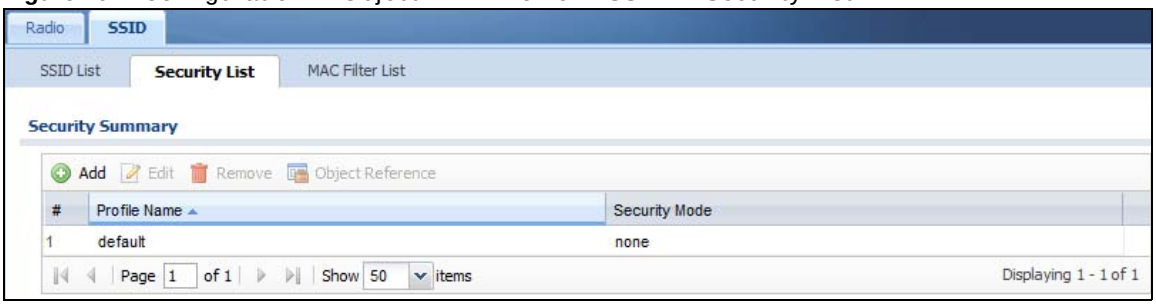
31.3.3 Security List

This screen allows you to manage wireless security configurations that can be used by your SSIDs. Wireless security is implemented strictly between the AP broadcasting the SSID and the stations that are connected to it.

To access this screen click **Configuration > Object > AP Profile > SSID > Security List**.

Note: You can have a maximum of 32 security profiles on the UAG.

Figure 202 Configuration > Object > AP Profile > SSID > Security List



The following table describes the labels in this screen.

Table 149 Configuration > Object > AP Profile > SSID > Security List

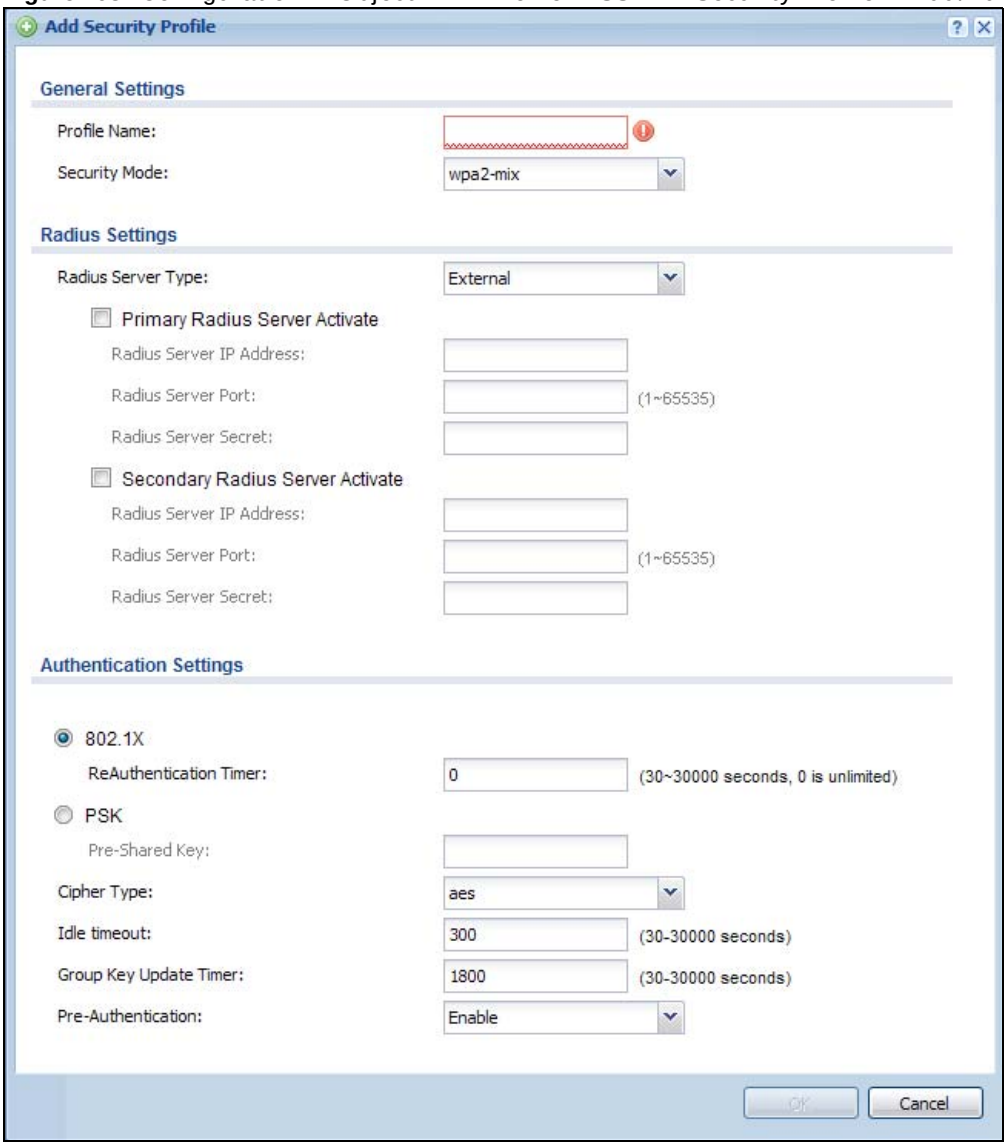
LABEL	DESCRIPTION
Add	Click this to add a new security profile.
Edit	Click this to edit the selected security profile.
Remove	Click this to remove the selected security profile.
Object Reference	Click this to view which other objects are linked to the selected security profile (for example, SSID profile).
#	This field is a sequential value, and it is not associated with a specific profile.
Profile Name	This field indicates the name assigned to the security profile.
Security Mode	This field indicates this profile's security mode (if any).

31.3.4 Add/Edit Security Profile

This screen allows you to create a new security profile or edit an existing one. To access this screen, click the **Add** button or select a security profile from the list and click the **Edit** button.

Note: This screen's options change based on the **Security Mode** selected. Only the default screen is displayed here.

Figure 203 Configuration > Object > AP Profile > SSID > Security Profile > Add/Edit Security Profile



The following table describes the labels in this screen.

Table 150 Configuration > Object > AP Profile > SSID > Security Profile > Add/Edit Security Profile

LABEL	DESCRIPTION
Profile Name	Enter up to 31 alphanumeric characters for the profile name. This name is only visible in the Web Configurator and is only for management purposes. Spaces and underscores are allowed.
Security Mode	Select a security mode from the list: **wep**, **wpa**, **wpa2**, or **wpa2-mix**.

Table 150 Configuration > Object > AP Profile > SSID > Security Profile > Add/Edit Security Profile

LABEL	DESCRIPTION
Radius Server Type	Select **Internal** to use the UAG's internal authentication database, or **External** to use an external RADIUS server for authentication.
Primary / Secondary Radius Server Activate	Select this to have the UAG use the specified RADIUS server.
Radius Server IP Address	Enter the IP address of the RADIUS server to be used for authentication.
Radius Server Port	Enter the port number of the RADIUS server to be used for authentication.
Radius Server Secret	Enter the shared secret password of the RADIUS server to be used for authentication.
802.1X	Select this to enable 802.1x secure authentication.
Auth. Method	This field is available only when you set the RADIUS server type to **Internal**. Select an authentication method if you have created any in the **Configuration > Object > Auth. Method** screen.
Reauthentication Timer	Enter the interval (in seconds) between authentication requests. Enter a 0 for unlimited requests.
The following fields are available if you set **Security Mode** to **wep**.	
Idle Timeout	Enter the idle interval (in seconds) that a client can be idle before authentication is discontinued.
Authentication Type	Select a WEP authentication method. Choices are **Open** or **Share** key.
Key Length	Select the bit-length of the encryption key to be used in WEP connections. If you select **WEP-64**: • Enter 10 hexadecimal digits in the range of "A-F", "a-f" and "0-9" (for example, 0x11AA22BB33) for each **Key** used. or • Enter 5 ASCII characters (case sensitive) ranging from "a-z", "A-Z" and "0-9" (for example, MyKey) for each **Key** used. If you select **WEP-128**: • Enter 26 hexadecimal digits in the range of "A-F", "a-f" and "0-9" (for example, 0x00112233445566778899AABBCC) for each **Key** used. or • Enter 13 ASCII characters (case sensitive) ranging from "a-z", "A-Z" and "0-9" (for example, MyKey12345678) for each **Key** used.
Key 1~4	Based on your **Key Length** selection, enter the appropriate length hexadecimal or ASCII key.
The following fields are available if you set **Security Mode** to **wpa**, **wpa2** or **wpa2-mix**.	
PSK	Select this option to use a Pre-Shared Key with WPA encryption.
Pre-Shared Key	Enter a pre-shared key of between 8 and 63 case-sensitive ASCII characters (including spaces and symbols) or 64 hexadecimal characters.
Cipher Type	Select an encryption cipher type from the list. • **auto** - This automatically chooses the best available cipher based on the cipher in use by the wireless client that is attempting to make a connection. • **tkip** - This is the Temporal Key Integrity Protocol encryption method added later to the WEP encryption protocol to further secure. Not all wireless clients may support this. • **aes** - This is the Advanced Encryption Standard encryption method. It is a more recent development over TKIP and considerably more robust. Not all wireless clients may support this.

Table 150 Configuration > Object > AP Profile > SSID > Security Profile > Add/Edit Security Profile

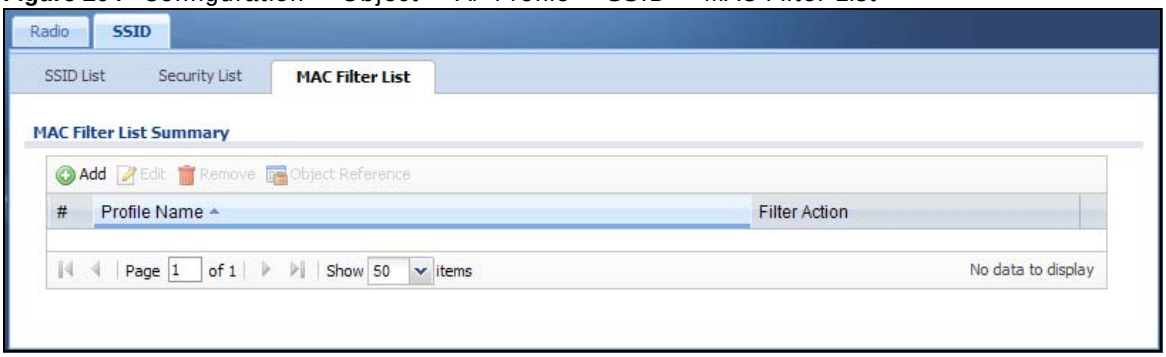
LABEL	DESCRIPTION
Idle Timeout	Enter the idle interval (in seconds) that a client can be idle before authentication is discontinued.
Group Key Update Timer	Enter the interval (in seconds) at which the AP updates the group WPA encryption key.
Pre-Authentication	This field is available only when you set **Security Mode** to **wpa2** or **wpa2-mix** and enable 802.1x authentication. **Enable** or **Disable** pre-authentication to allow the AP to send authentication information to other APs on the network, allowing connected wireless clients to switch APs without having to re-authenticate their network connection.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

31.3.5 MAC Filter List

This screen allows you to create and manage security configurations that can be used by your SSIDs. To access this screen click **Configuration > Object > AP Profile > SSID > MAC Filter List**.

Note: You can have a maximum of 32 MAC filtering profiles on the UAG.

Figure 204 Configuration > Object > AP Profile > SSID > MAC Filter List



The following table describes the labels in this screen.

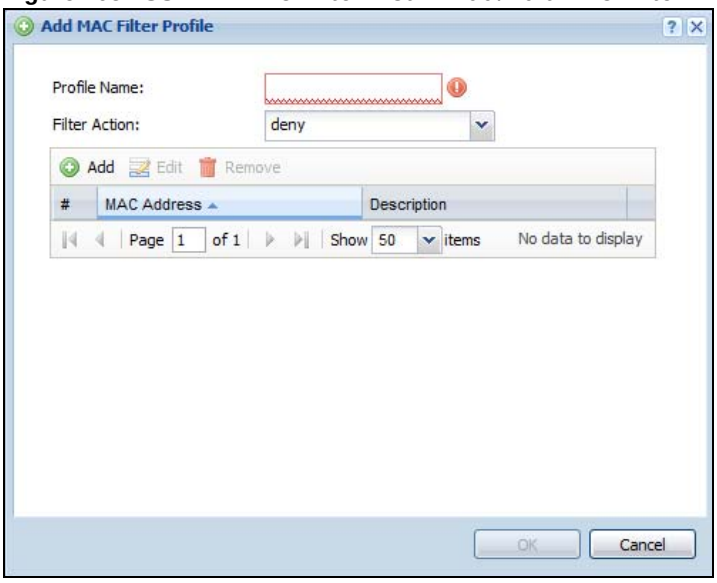
Table 151 Configuration > Object > AP Profile > SSID > MAC Filter List

LABEL	DESCRIPTION
Add	Click this to add a new MAC filtering profile.
Edit	Click this to edit the selected MAC filtering profile.
Remove	Click this to remove the selected MAC filtering profile.
Object Reference	Click this to view which other objects are linked to the selected MAC filtering profile (for example, SSID profile).
#	This field is a sequential value, and it is not associated with a specific profile.
Profile Name	This field indicates the name assigned to the MAC filtering profile.
Filter Action	This field indicates this profile's filter action (if any).

31.3.6 Add/Edit MAC Filter Profile

This screen allows you to create a new MAC filtering profile or edit an existing one. To access this screen, click the **Add** button or select a MAC filter profile from the list and click the **Edit** button.

Figure 205 SSID > MAC Filter List > Add/Edit MAC Filter Profile



The following table describes the labels in this screen.

Table 152 SSID > MAC Filter List > Add/Edit MAC Filter Profile

LABEL	DESCRIPTION
Profile Name	Enter up to 31 alphanumeric characters for the profile name. This name is only visible in the Web Configurator and is only for management purposes. Spaces and underscores are allowed.
Filter Action	Select **allow** to permit the wireless client with the MAC addresses in this profile to connect to the network through the associated SSID; select **deny** to block the wireless clients with the specified MAC addresses.
Add	Click this to add a MAC address to the profile's list.
Edit	Click this to edit the selected MAC address in the profile's list.
Remove	Click this to remove the selected MAC address from the profile's list.
#	This field is a sequential value, and it is not associated with a specific profile.
MAC Address	This field specifies a MAC address associated with this profile.
Description	This field displays a description for the MAC address associated with this profile. You can click the description to make it editable. Enter up to 60 characters, spaces and underscores allowed.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

32

Addresses

32.1 Overview

Address objects can represent a single IP address or a range of IP addresses. Address groups are composed of address objects and other address groups.

32.1.1 What You Can Do in this Chapter

- The **Address** screen (Section 32.2 on page 304) provides a summary of all addresses in the UAG. Use the **Address Add/Edit** screen to create a new address or edit an existing one.
- Use the **Address Group** summary screen (Section 32.3 on page 306) and the **Address Group Add/Edit** screen, to maintain address groups in the UAG.

32.1.2 What You Need To Know

Address objects and address groups are used in dynamic routes, firewall rules, and VPN 1-1 mapping profiles. Please see the respective sections for more information about how address objects and address groups are used in each one.

Address groups are composed of address objects and address groups. The sequence of members in the address group is not important.

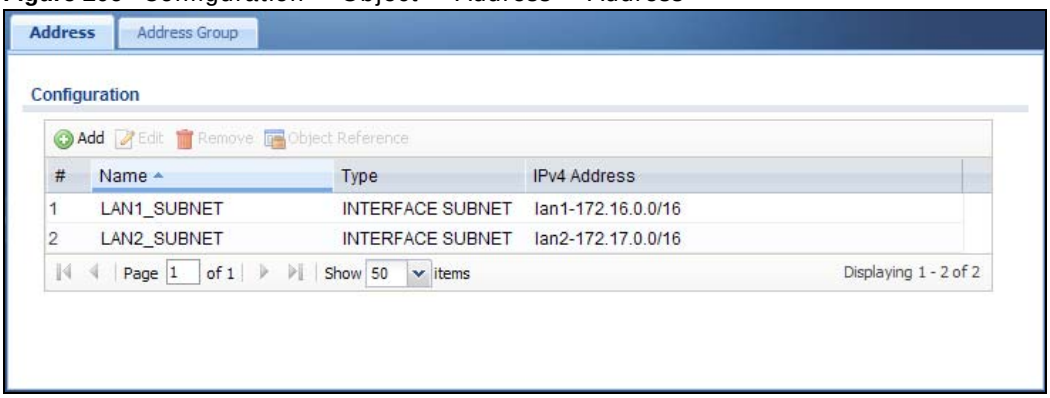
32.2 Address Summary Screen

The address screens are used to create, maintain, and remove addresses. There are the types of address objects.

- **HOST** - a host address is defined by an **IP Address**.
- **RANGE** - a range address is defined by a **Starting IP Address** and an **Ending IP Address**.
- **SUBNET** - a network address is defined by a **Network** IP address and **Netmask** subnet mask.

The **Address** screen provides a summary of all addresses in the UAG. To access this screen, click **Configuration > Object** > **Address > Address**. Click a column's heading cell to sort the table entries by that column's criteria. Click the heading cell again to reverse the sort order.

Figure 206 Configuration > Object > Address > Address



The following table describes the labels in this screen. See Section 32.2.1 on page 305 for more information as well.

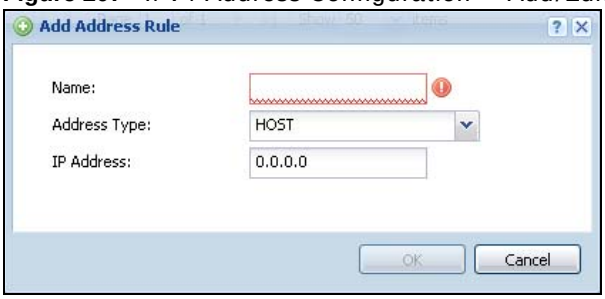
Table 153 Configuration > Object > Address > Address

LABEL	DESCRIPTION
Configuration	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific address.
Name	This field displays the configured name of each address object.
Type	This field displays the type of each address object. "**INTERFACE**" means the object uses the settings of one of the UAG's interfaces.
IPv4 Address	This field displays the IPv4 addresses represented by each address object. If the object's settings are based on one of the UAG's interfaces, the name of the interface displays first followed by the object's current address settings.

32.2.1 Address Add/Edit Screen

The **Configuration > Object > Address Add/Edit** screen allows you to create a new address or edit an existing one. To access this screen, go to the **Address** screen (see Section 32.2 on page 304), and click either the **Add** icon or an **Edit** icon in the **Configuration** section.

Figure 207 IPv4 Address Configuration > Add/Edit



The following table describes the labels in this screen.

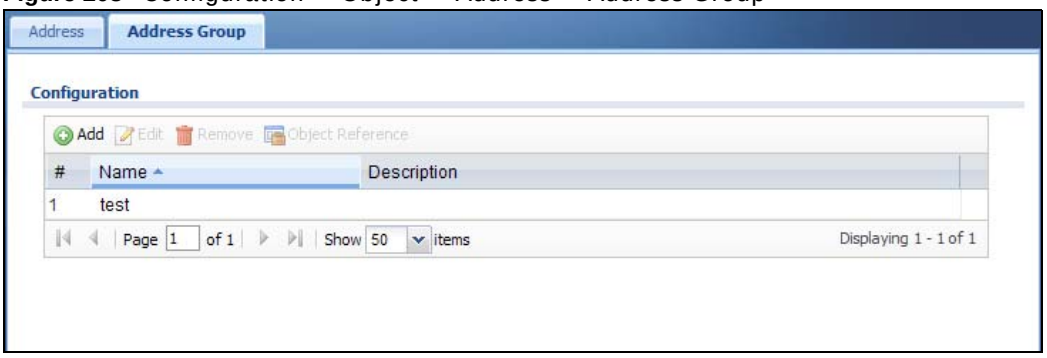
Table 154 IPv4 Address Configuration > Add/Edit

LABEL	DESCRIPTION
Name	Type the name used to refer to the address. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Address Type	Select the type of address you want to create. Choices are: **HOST**, **RANGE**, **SUBNET**, **INTERFACE IP**, **INTERFACE SUBNET**, and **INTERFACE GATEWAY**. Note: The UAG automatically updates address objects that are based on an interface's IP address, subnet, or gateway if the interface's IP address settings change. For example, if you change lan1's IP address, the UAG automatically updates the corresponding interface-based, LAN subnet address object.
IP Address	This field is only available if the **Address Type** is **HOST**. This field cannot be blank. Enter the IP address that this address object represents.
Starting IP Address	This field is only available if the **Address Type** is **RANGE**. This field cannot be blank. Enter the beginning of the range of IP addresses that this address object represents.
Ending IP Address	This field is only available if the **Address Type** is **RANGE**. This field cannot be blank. Enter the end of the range of IP address that this address object represents.
Network	This field is only available if the **Address Type** is **SUBNET**, in which case this field cannot be blank. Enter the IP address of the network that this address object represents.
Netmask	This field is only available if the **Address Type** is **SUBNET**, in which case this field cannot be blank. Enter the subnet mask of the network that this address object represents. Use dotted decimal format.
Interface	If you selected **INTERFACE IP**, **INTERFACE SUBNET**, or **INTERFACE GATEWAY** as the **Address Type**, use this field to select the interface of the network that this address object represents.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

32.3 Address Group Summary Screen

The **Address Group** screen provides a summary of all address groups. To access this screen, click **Configuration > Object** > **Address > Address Group**. Click a column's heading cell to sort the table entries by that column's criteria. Click the heading cell again to reverse the sort order.

Figure 208 Configuration > Object > Address > Address Group



The following table describes the labels in this screen. See Section 32.3.1 on page 307 for more information as well.

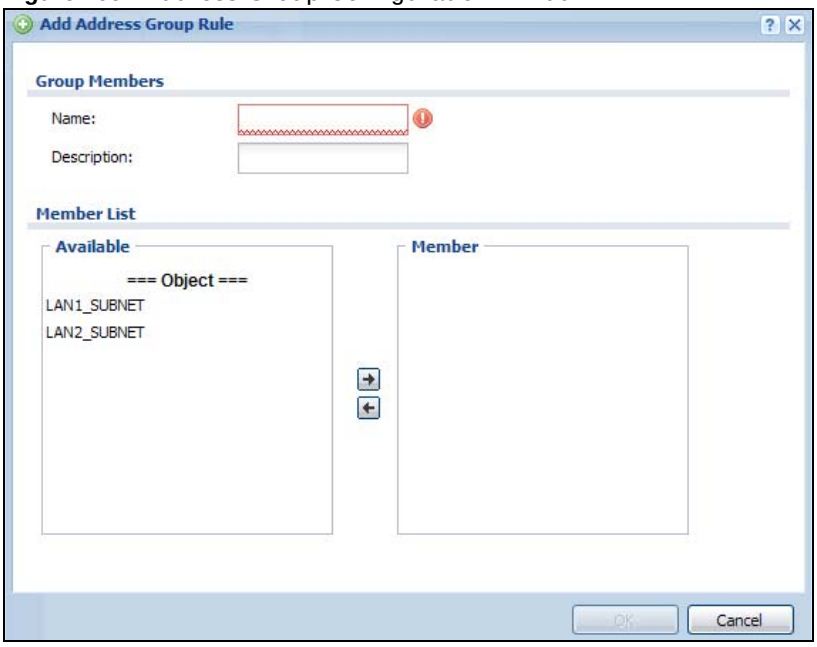
Table 155 Configuration > Object > Address > Address Group

LABEL	DESCRIPTION
Configuration	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific address group.
Name	This field displays the name of each address group.
Description	This field displays the description of each address group, if any.

32.3.1 Address Group Add/Edit Screen

The **Address Group Add / Edit** screen allows you to create a new address group or edit an existing one. To access this screen, go to the **Address Group** screen (see Section 32.3 on page 306), and click either the **Add** icon or an **Edit** icon in the **Configuration** section.

Figure 209 Address Group Configuration > Add



The following table describes the labels in this screen.

Table 156 Address Group Configuration > Add

LABEL	DESCRIPTION
Name	Enter a name for the address group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Description	This field displays the description of each address group, if any. You can use up to 60 characters, punctuation marks, and spaces.
Member List	The **Member** list displays the names of the address and address group objects that have been added to the address group. The order of members is not important. Select items from the **Available** list that you want to be members and move them to the **Member** list. You can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entries and use the arrow button to move them. Move any members you do not want included to the **Available** list.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

33

Services

33.1 Overview

Use service objects to define TCP applications, UDP applications, and ICMP messages. You can also create service groups to refer to multiple service objects in other features.

33.1.1 What You Can Do in this Chapter

- Use the **Service** screens (Section 33.2 on page 310) to view and configure the UAG's list of services and their definitions.
- Use the **Service Group** screens (Section 33.2 on page 310) to view and configure the UAG's list of service groups.

33.1.2 What You Need to Know

IP Protocols

IP protocols are based on the eight-bit protocol field in the IP header. This field represents the next-level protocol that is sent in this packet. This section discusses three of the most common IP protocols.

Computers use Transmission Control Protocol (TCP, IP protocol 6) and User Datagram Protocol (UDP, IP protocol 17) to exchange data with each other. TCP guarantees reliable delivery but is slower and more complex. Some uses are FTP, HTTP, SMTP, and TELNET. UDP is simpler and faster but is less reliable. Some uses are DHCP, DNS, RIP, and SNMP.

TCP creates connections between computers to exchange data. Once the connection is established, the computers exchange data. If data arrives out of sequence or is missing, TCP puts it in sequence or waits for the data to be re-transmitted. Then, the connection is terminated.

In contrast, computers use UDP to send short messages to each other. There is no guarantee that the messages arrive in sequence or that the messages arrive at all.

Both TCP and UDP use ports to identify the source and destination. Each port is a 16-bit number. Some port numbers have been standardized and are used by low-level system processes; many others have no particular meaning.

Unlike TCP and UDP, Internet Control Message Protocol (ICMP, IP protocol 1) is mainly used to send error messages or to investigate problems. For example, ICMP is used to send the response if a computer cannot be reached. Another use is ping. ICMP does not guarantee delivery, but networks often treat ICMP messages differently, sometimes looking at the message itself to decide where to send it.

Service Objects and Service Groups

Use service objects to define IP protocols.

- TCP applications
- UDP applications
- ICMP messages
- user-defined services (for other types of IP protocols)

These objects are used in policy routes, and firewall rules.

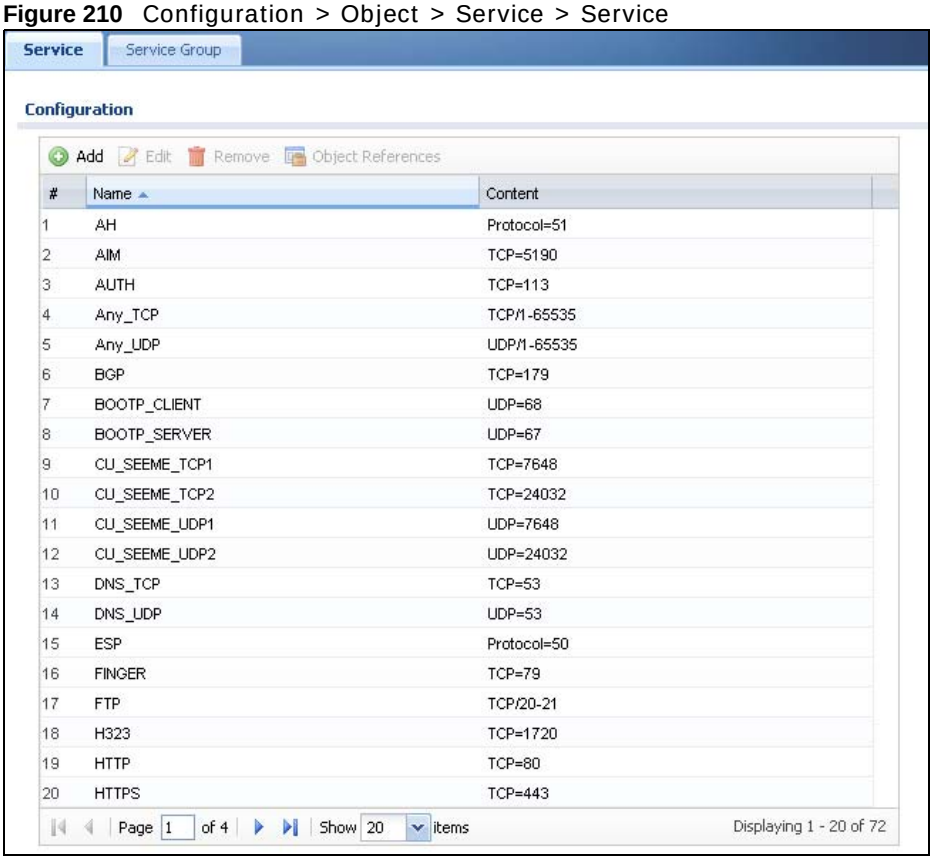
Use service groups when you want to create the same rule for several services, instead of creating separate rules for each service. Service groups may consist of services and other service groups. The sequence of members in the service group is not important.

33.2 The Service Summary Screen

The **Service** summary screen provides a summary of all services and their definitions. In addition, this screen allows you to add, edit, and remove services.

To access this screen, log in to the Web Configurator, and click **Configuration > Object > Service > Service**. Click a column's heading cell to sort the table entries by that column's criteria. Click the heading cell again to reverse the sort order.

Figure 210 Configuration > Object > Service > Service



The following table describes the labels in this screen.

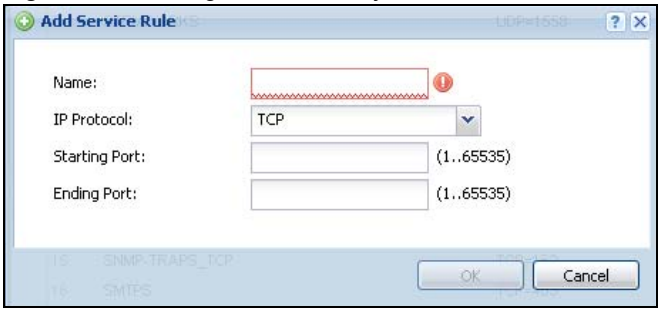
Table 157 Configuration > Object > Service > Service

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific service.
Name	This field displays the name of each service.
Content	This field displays a description of each service.

33.2.1 The Service Add/Edit Screen

The **Service Add / Edit** screen allows you to create a new service or edit an existing one. To access this screen, go to the **Service** screen (see Section 33.2 on page 310), and click either the **Add** icon or an **Edit** icon.

Figure 211 Configuration > Object > Service > Service > Edit



The following table describes the labels in this screen.

Table 158 Configuration > Object > Service > Service > Edit

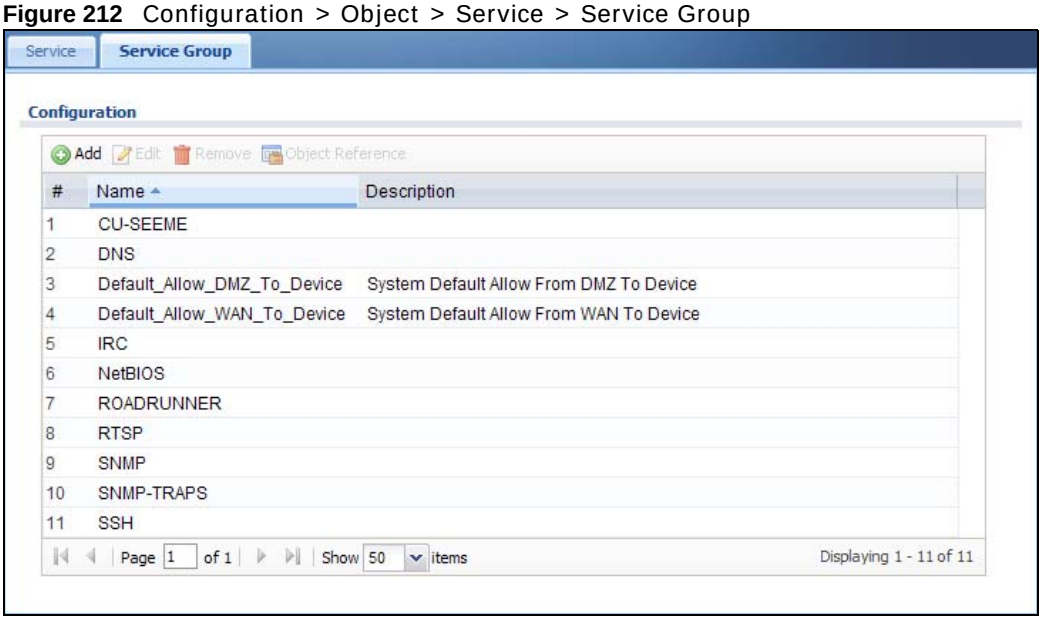
LABEL	DESCRIPTION
Name	Type the name used to refer to the service. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
IP Protocol	Select the protocol the service uses. Choices are: **TCP**, **UDP**, **ICMP**, and **User Defined**.
Starting Port Ending Port	This field appears if the **IP Protocol** is **TCP** or **UDP**. Specify the port number(s) used by this service. If you fill in one of these fields, the service uses that port. If you fill in both fields, the service uses the range of ports.
ICMP Type	This field appears if the **IP Protocol** is **ICMP**. Select the ICMP message used by this service. This field displays the message text, not the message number.
IP Protocol Number	This field appears if the **IP Protocol** is **User Defined**. Enter the number of the next-level protocol (IP protocol). Allowed values are 1 - 255.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

33.3 The Service Group Summary Screen

The **Service Group** summary screen provides a summary of all service groups. In addition, this screen allows you to add, edit, and remove service groups.

To access this screen, log in to the Web Configurator, and click **Configuration > Object** > **Service** > **Service Group**.

Figure 212 Configuration > Object > Service > Service Group



The following table describes the labels in this screen. See Section 33.3.1 on page 312 for more information as well.

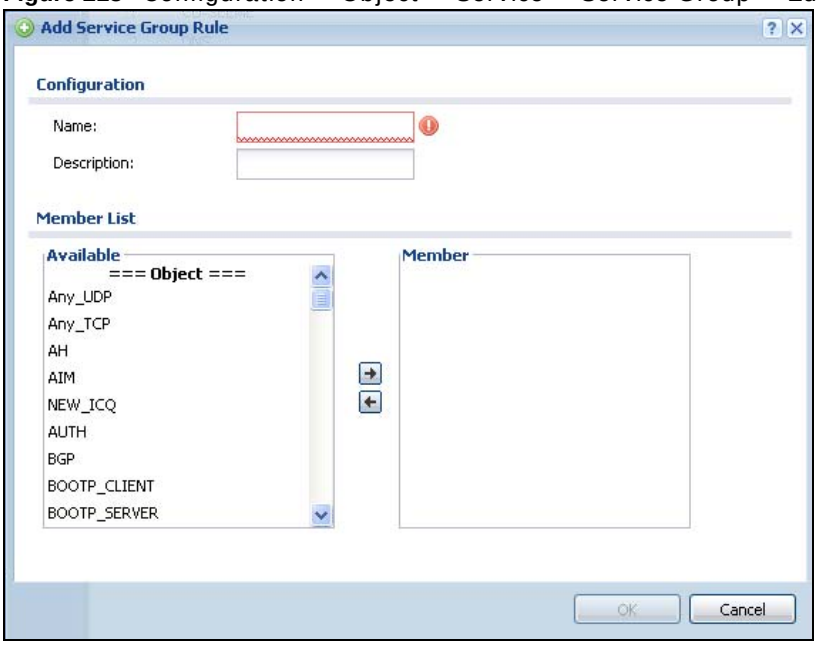
Table 159 Configuration > Object > Service > Service Group

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific service group.
Name	This field displays the name of each service group. By default, the UAG uses services starting with "Default_Allow_" in the firewall rules to allow certain services to connect to the UAG.
Description	This field displays the description of each service group, if any.

33.3.1 The Service Group Add/Edit Screen

The **Service Group Add/Edit** screen allows you to create a new service group or edit an existing one. To access this screen, go to the **Service Group** screen (see Section 33.3 on page 312), and click either the **Add** icon or an **Edit** icon.

Figure 213 Configuration > Object > Service > Service Group > Edit



The following table describes the labels in this screen.

Table 160 Configuration > Object > Service > Service Group > Edit

LABEL	DESCRIPTION
Name	Enter the name of the service group. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Description	Enter a description of the service group, if any. You can use up to 60 printable ASCII characters.
Member List	The **Member** list displays the names of the service and service group objects that have been added to the service group. The order of members is not important. Select items from the **Available** list that you want to be members and move them to the **Member** list. You can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entries and use the arrow button to move them. Move any members you do not want included to the **Available** list.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

34

Schedules

34.1 Overview

Use schedules to set up one-time and recurring schedules for policy routes, and firewall rules. The UAG supports one-time and recurring schedules. One-time schedules are effective only once, while recurring schedules usually repeat. Both types of schedules are based on the current date and time in the UAG.

Note: Schedules are based on the UAG's current date and time.

34.1.1 What You Can Do in this Chapter

- Use the **Schedule** summary screen (Section 34.2 on page 315) to see a list of all schedules in the UAG.
- Use the **One-Time Schedule Add / Edit** screen (Section 34.2.1 on page 316) to create or edit a one-time schedule.
- Use the **Recurring Schedule Add / Edit** screen (Section 34.2.2 on page 317) to create or edit a recurring schedule.

34.1.2 What You Need to Know

One-time Schedules

One-time schedules begin on a specific start date and time and end on a specific stop date and time. One-time schedules are useful for long holidays and vacation periods.

Recurring Schedules

Recurring schedules begin at a specific start time and end at a specific stop time on selected days of the week (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday). Recurring schedules always begin and end in the same day. Recurring schedules are useful for defining the workday and off-work hours.

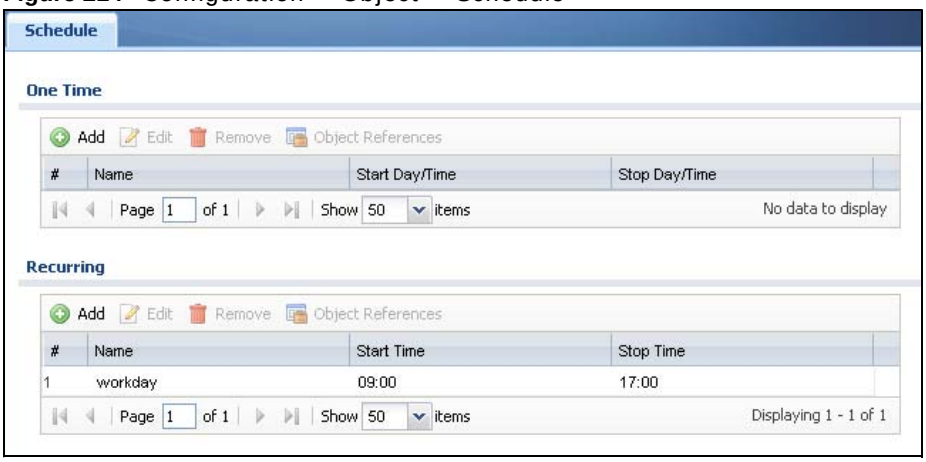
Finding Out More

- See Section 39.4 on page 346 for information about the UAG's current date and time.

34.2 The Schedule Summary Screen

The **Schedule** summary screen provides a summary of all schedules in the UAG. To access this screen, click **Configuration > Object** > **Schedule**.

Figure 214 Configuration > Object > Schedule



The following table describes the labels in this screen. See Section 34.2.1 on page 316 and Section 34.2.2 on page 317 for more information as well.

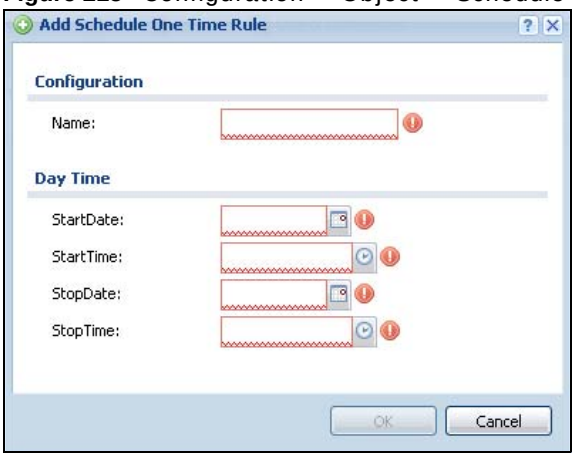
Table 161 Configuration > Object > Schedule

LABEL	DESCRIPTION
One Time	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific schedule.
Name	This field displays the name of the schedule, which is used to refer to the schedule.
Start Day / Time	This field displays the date and time at which the schedule begins.
Stop Day / Time	This field displays the date and time at which the schedule ends.
Recurring	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field is a sequential value, and it is not associated with a specific schedule.
Name	This field displays the name of the schedule, which is used to refer to the schedule.
Start Time	This field displays the time at which the schedule begins.
Stop Time	This field displays the time at which the schedule ends.

34.2.1 The One-Time Schedule Add/Edit Screen

The **One-Time Schedule Add/Edit** screen allows you to define a one-time schedule or edit an existing one. To access this screen, go to the **Schedule** screen (see Section 34.2 on page 315), and click either the **Add** icon or an **Edit** icon in the **One Time** section.

Figure 215 Configuration > Object > Schedule > Edit (One Time)



The following table describes the labels in this screen.

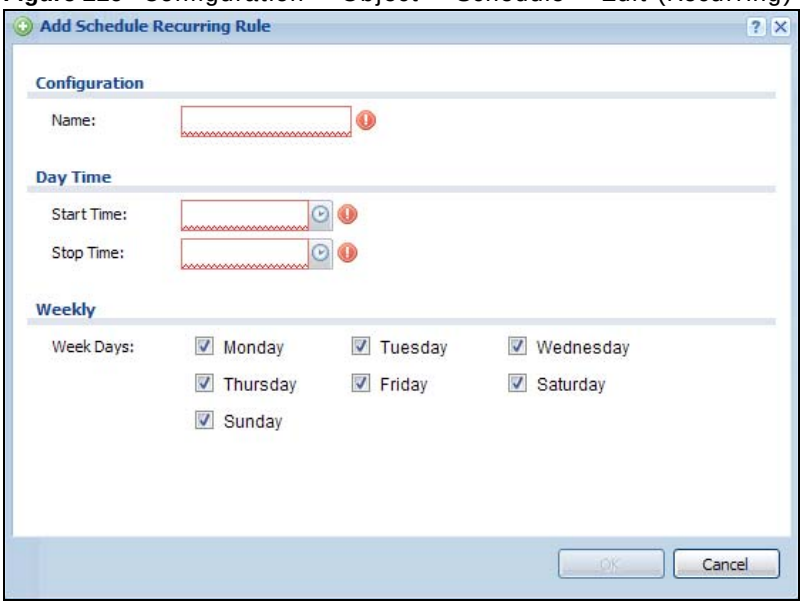
Table 162 Configuration > Object > Schedule > Edit (One Time)

LABEL	DESCRIPTION
Configuration	
Name	Type the name used to refer to the one-time schedule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Date Time	
StartDate	Specify the year, month, and day when the schedule begins. • **Year** - 1900 - 2999 • **Month** - 1 - 12 • **Day** - 1 - 31 (it is not possible to specify illegal dates, such as February 31.)
StartTime	Specify the hour and minute when the schedule begins. • **Hour** - 0 - 23 • **Minute** - 0 - 59
StopDate	Specify the year, month, and day when the schedule ends. • **Year** - 1900 - 2999 • **Month** - 1 - 12 • **Day** - 1 - 31 (it is not possible to specify illegal dates, such as February 31.)
StopTime	Specify the hour and minute when the schedule ends. • **Hour** - 0 - 23 • **Minute** - 0 - 59
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

34.2.2 The Recurring Schedule Add/Edit Screen

The **Recurring Schedule Add/Edit** screen allows you to define a recurring schedule or edit an existing one. To access this screen, go to the **Schedule** screen (see Section 34.2 on page 315), and click either the **Add** icon or an **Edit** icon in the **Recurring** section.

Figure 216 Configuration > Object > Schedule > Edit (Recurring)



The **Year**, **Month**, and **Day** columns are not used in recurring schedules and are disabled in this screen. The following table describes the remaining labels in this screen.

Table 163 Configuration > Object > Schedule > Edit (Recurring)

LABEL	DESCRIPTION
Configuration	
Name	Type the name used to refer to the recurring schedule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Date Time	
StartTime	Specify the hour and minute when the schedule begins each day. • **Hour** - 0 - 23 • **Minute** - 0 - 59
StopTime	Specify the hour and minute when the schedule ends each day. • **Hour** - 0 - 23 • **Minute** - 0 - 59
Weekly	
Week Days	Select each day of the week the recurring schedule is effective.
OK	Click **OK** to save your changes back to the UAG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

35

AAA Server

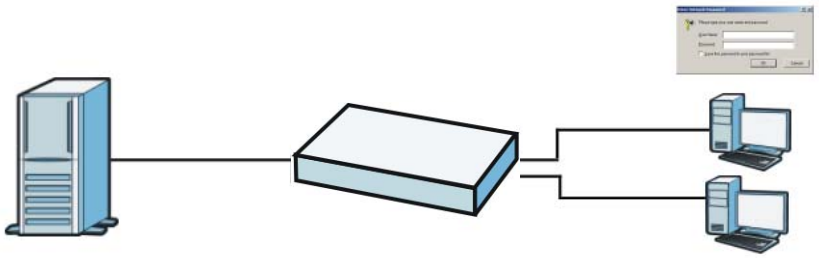
35.1 Overview

You can use a AAA (Authentication, Authorization, Accounting) server to provide access control to your network. The AAA server can be a RADIUS server. Use the **AAA Server** screens to create and manage objects that contain settings for using AAA servers. You use AAA server objects in configuring ext-group-user user objects and authentication method objects (see Chapter 36 on page 322).

35.1.1 RADIUS Server

RADIUS (Remote Authentication Dial-In User Service) authentication is a popular protocol used to authenticate users by means of an external server instead of (or in addition to) an internal device user database that is limited to the memory capacity of the device. In essence, RADIUS authentication allows you to validate a large number of users from a central location.

Figure 217 RADIUS Server Network Example



35.1.2 What You Can Do in this Chapter

Use the **Configuration > Object > AAA Server > RADIUS** screen (Section 35.2 on page 319) to configure the default external RADIUS server to use for user authentication.

35.1.3 What You Need To Know

AAA Servers Supported by the UAG

The following lists the types of authentication server the UAG supports.

- Local user database

  The UAG uses the built-in local user database to authenticate administrative users logging into the UAG's Web Configurator or network access users logging into the network through the UAG.

- RADIUS

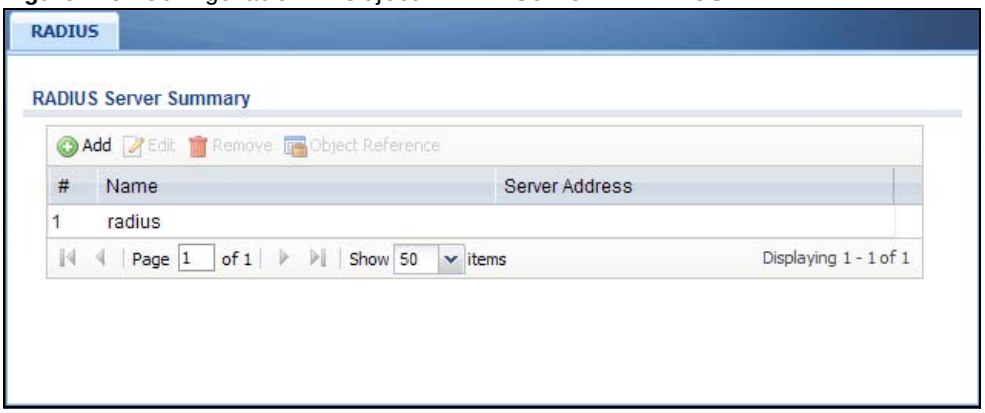
  RADIUS (Remote Authentication Dial-In User Service) authentication is a popular protocol used to authenticate users by means of an external or built-in RADIUS server. RADIUS authentication allows you to validate a large number of users from a central location.

35.2 RADIUS Server Summary

Use the **RADIUS** screen to manage the list of RADIUS servers the UAG can use in authenticating users.

Click **Configuration > Object > AAA Server > RADIUS** to display the **RADIUS** screen.

Figure 218 Configuration > Object > AAA Server > RADIUS



The following table describes the labels in this screen.

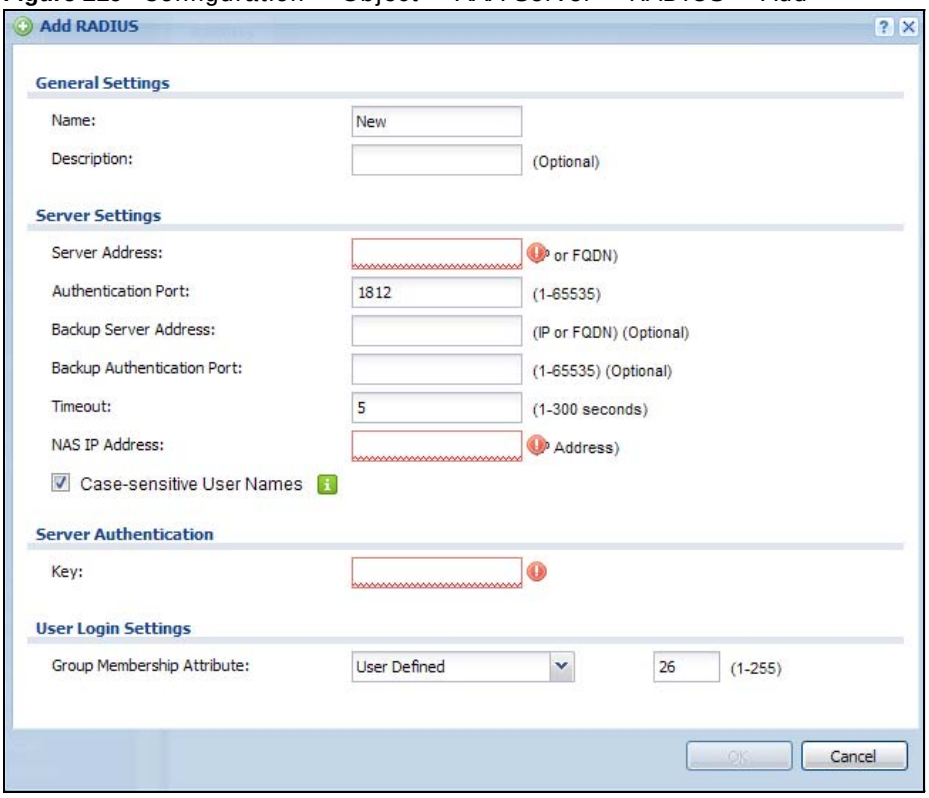
Table 164 Configuration > Object > AAA Server > RADIUS

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field displays the index number.
Name	This is the name of the RADIUS server entry.
Server Address	This is the address of the RADIUS server.

35.2.1 Adding a RADIUS Server

Click **Configuration > Object > AAA Server > RADIUS** to display the **RADIUS** screen. Click the **Add** icon or an **Edit** icon to display the following screen. Use this screen to create a new RADIUS entry or edit an existing one.

Figure 219 Configuration > Object > AAA Server > RADIUS > Add



The following table describes the labels in this screen.

Table 165 Configuration > Object > AAA Server > RADIUS > Add

LABEL	DESCRIPTION
Name	Enter a descriptive name (up to 63 alphanumerical characters) for identification purposes.
Description	Enter the description of each server, if any. You can use up to 60 printable ASCII characters.
Server Address	Enter the address of the RADIUS server.
Authentication Port	Specify the port number on the RADIUS server to which the UAG sends authentication requests. Enter a number between 1 and 65535.
Backup Server Address	If the RADIUS server has a backup server, enter its address here.
Backup Authentication Port	Specify the port number on the RADIUS server to which the UAG sends authentication requests. Enter a number between 1 and 65535.
Timeout	Specify the timeout period (between 1 and 300 seconds) before the UAG disconnects from the RADIUS server. In this case, user authentication fails. Search timeout occurs when either the user information is not in the RADIUS server or the RADIUS server is down.
NAS IP Address	If the RADIUS server requires the UAG to provide the Network Access Server (NAS) IP address attribute with a specific value, enter it here.
Case-sensitive User Names	Select this if the server checks the case of the usernames.

Table 165 Configuration > Object > AAA Server > RADIUS > Add (continued)

LABEL	DESCRIPTION
Key	Enter a password (up to 15 alphanumeric characters) as the key to be shared between the external authentication server and the UAG. The key is not sent over the network. This key must be the same on the external authentication server and the UAG.
Group Membership Attribute	A RADIUS server defines attributes for its accounts. Select the name and number of the attribute that the UAG is to check to determine to which group a user belongs. If it does not display, select user-defined and specify the attribute's number. This attribute's value is called a group identifier; it determines to which group a user belongs. You can add **ext-group-user** user objects to identify groups based on these group identifier values. For example you could have an attribute named "memberOf" with values like "sales", "RD", and "management". Then you could also create a **ext-group-user** user object for each group. One with "sales" as the group identifier, another for "RD" and a third for "management".
OK	Click **OK** to save the changes.
Cancel	Click **Cancel** to discard the changes.

36

Authentication Method

36.1 Overview

Authentication method objects set how the UAG authenticates wireless, HTTP/HTTPS clients, and peer IPSec routers (extended authentication) clients. Configure authentication method objects to have the UAG use the local user database, and/or the authentication servers and authentication server groups specified by AAA server objects. By default, user accounts created and stored on the UAG are authenticated locally.

36.1.1 What You Can Do in this Chapter

- Use the **Configuration > Object > Auth. Method** screens (Section 36.2 on page 322) to create and manage authentication method objects.

36.1.2 Before You Begin

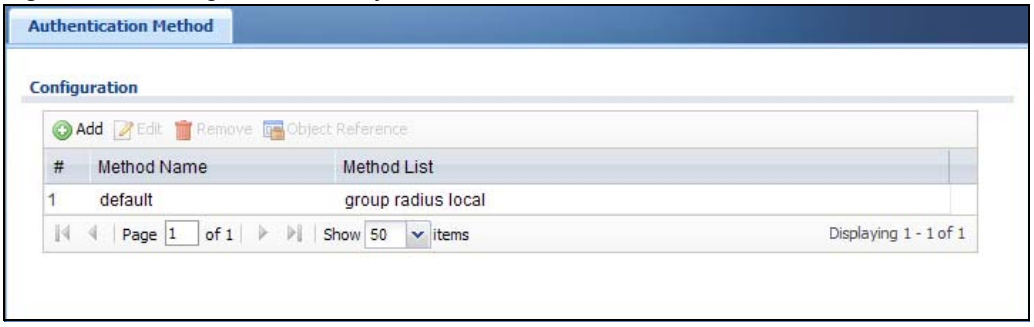
Configure AAA server objects (see Chapter 35 on page 318) before you configure authentication method objects.

36.2 Authentication Method Objects

Click **Configuration > Object > Auth. Method** to display the screen as shown.

Note: You can create up to four authentication method objects.

Figure 220 Configuration > Object > Auth. Method



The following table describes the labels in this screen.

Table 166 Configuration > Object > Auth. Method

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field displays the index number.
Method Name	This field displays a descriptive name for identification purposes.
Method List	This field displays the authentication method(s) for this entry.

36.2.1 Creating an Authentication Method Object

Follow the steps below to create an authentication method object.

1 Click **Configuration > Object > Auth. Method**.

2 Click **Add**.

3 Specify a descriptive name for identification purposes in the **Name** field. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. For example, "My_Device".

4 Click **Add** to insert an authentication method in the table.

5 Select a server object from the **Method List** drop-down list box.

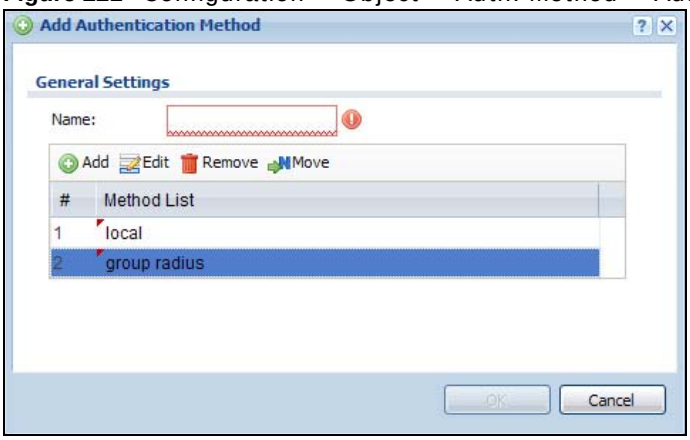
6 You can add up to four server objects to the table. The ordering of the **Method List** column is important. The UAG authenticates the users using the databases (in the local user database or the external authentication server) in the order they appear in this screen.

If two accounts with the same username exist on two authentication servers you specify, the UAG does not continue the search on the second authentication server when you enter the username and password that doesn't match the one on the first authentication server.

Note: You can NOT select two server objects of the same type.

7 Click **OK** to save the settings or click **Cancel** to discard all changes and return to the previous screen.

Figure 221 Configuration > Object > Auth. Method > Add



The following table describes the labels in this screen.

Table 167 Configuration > Object > Auth. Method > Add

LABEL	DESCRIPTION
Name	Specify a descriptive name for identification purposes. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive. For example, “My_Device”.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to modify the entry’s settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Move	To change a method’s position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed. The ordering of your methods is important as UAG authenticates the users using the authentication methods in the order they appear in this screen.
#	This field displays the index number.
Method List	Select a server object from the drop-down list box. You can create a server object in the **AAA Server** screen (see Chapter 35 on page 318 for more information). The UAG authenticates the users using the databases (in the local user database or the external authentication server) in the order they appear in this screen. If two accounts with the same username exist on two authentication servers you specify, the UAG does not continue the search on the second authentication server when you enter the username and password that doesn’t match the one on the first authentication server.
OK	Click **OK** to save the changes.
Cancel	Click **Cancel** to discard the changes.

37

Certificates

37.1 Overview

The UAG can use certificates (also called digital IDs) to authenticate users. Certificates are based on public-private key pairs. A certificate contains the certificate owner's identity and public key. Certificates provide a way to exchange public keys for use in authentication.

37.1.1 What You Can Do in this Chapter

- Use the **My Certificates** screens (see Section 37.2 on page 328 to Section 37.2.3 on page 334) to generate and export self-signed certificates or certification requests and import the CA-signed certificates.
- Use the **Trusted Certificates** screens (see Section 37.3 on page 335 to Section 37.3.2 on page 339) to save CA certificates and trusted remote host certificates to the UAG. The UAG trusts any valid certificate that you have imported as a trusted certificate. It also trusts any valid certificate signed by any of the certificates that you have imported as a trusted certificate.

37.1.2 What You Need to Know

When using public-key cryptology for authentication, each host has two keys. One key is public and can be made openly available. The other key is private and must be kept secure.

These keys work like a handwritten signature (in fact, certificates are often referred to as "digital signatures"). Only you can write your signature exactly as it should look. When people know what your signature looks like, they can verify whether something was signed by you, or by someone else. In the same way, your private key "writes" your digital signature and your public key allows people to verify whether data was signed by you, or by someone else. This process works as follows.

1. Tim wants to send a message to Jenny. He needs her to be sure that it comes from him, and that the message content has not been altered by anyone else along the way. Tim generates a public key pair (one public key and one private key).
2. Tim keeps the private key and makes the public key openly available. This means that anyone who receives a message seeming to come from Tim can read it and verify whether it is really from him or not.
3. Tim uses his private key to sign the message and sends it to Jenny.
4. Jenny receives the message and uses Tim's public key to verify it. Jenny knows that the message is from Tim, and that although other people may have been able to read the message, no-one can have altered it (because they cannot re-sign the message with Tim's private key).

5 Additionally, Jenny uses her own private key to sign a message and Tim uses Jenny's public key to verify the message.

The UAG uses certificates based on public-key cryptology to authenticate users attempting to establish a connection, not to encrypt the data that you send after establishing a connection. The method used to secure the data that you send through an established connection depends on the type of connection.

The certification authority uses its private key to sign certificates. Anyone can then use the certification authority's public key to verify the certificates.

A certification path is the hierarchy of certification authority certificates that validate a certificate. The UAG does not trust a certificate if any certificate on its path has expired or been revoked.

Certification authorities maintain directory servers with databases of valid and revoked certificates. A directory of certificates that have been revoked before the scheduled expiration is called a CRL (Certificate Revocation List). The UAG can check a peer's certificate against a directory server's list of revoked certificates. The framework of servers, software, procedures and policies that handles keys is called PKI (public-key infrastructure).

Advantages of Certificates

Certificates offer the following benefits.

- The UAG only has to store the certificates of the certification authorities that you decide to trust, no matter how many devices you need to authenticate.
- Key distribution is simple and very secure since you can freely distribute public keys and you never need to transmit private keys.

Self-signed Certificates

You can have the UAG act as a certification authority and sign its own certificates.

Factory Default Certificate

The UAG generates its own unique self-signed certificate when you first turn it on. This certificate is referred to in the GUI as the factory default certificate.

Certificate File Formats

Any certificate that you want to import has to be in one of these file formats:

- Binary X.509: This is an ITU-T recommendation that defines the formats for X.509 certificates.
- PEM (Base-64) encoded X.509: This Privacy Enhanced Mail format uses lowercase letters, uppercase letters and numerals to convert a binary X.509 certificate into a printable form.
- Binary PKCS#7: This is a standard that defines the general syntax for data (including digital signatures) that may be encrypted. A PKCS #7 file is used to transfer a public key certificate. The private key is not included. The UAG currently allows the importation of a PKS#7 file that contains a single certificate.
- PEM (Base-64) encoded PKCS#7: This Privacy Enhanced Mail (PEM) format uses lowercase letters, uppercase letters and numerals to convert a binary PKCS#7 certificate into a printable form.

- Binary PKCS#12: This is a format for transferring public key and private key certificates. The private key in a PKCS #12 file is within a password-encrypted envelope. The file's password is not connected to your certificate's public or private passwords. Exporting a PKCS #12 file creates this and you must provide it to decrypt the contents when you import the file into the UAG.

Note: Be careful not to convert a binary file to text during the transfer process. It is easy for this to occur since many programs use text files by default.

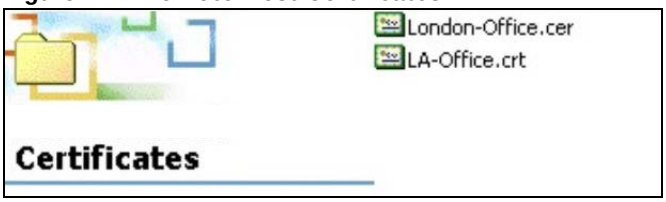
37.1.3 Verifying a Certificate

Before you import a trusted certificate into the UAG, you should verify that you have the correct certificate. You can do this using the certificate's fingerprint. A certificate's fingerprint is a message digest calculated using the MD5 or SHA1 algorithm. The following procedure describes how to check a certificate's fingerprint to verify that you have the actual certificate.

1 Browse to where you have the certificate saved on your computer.

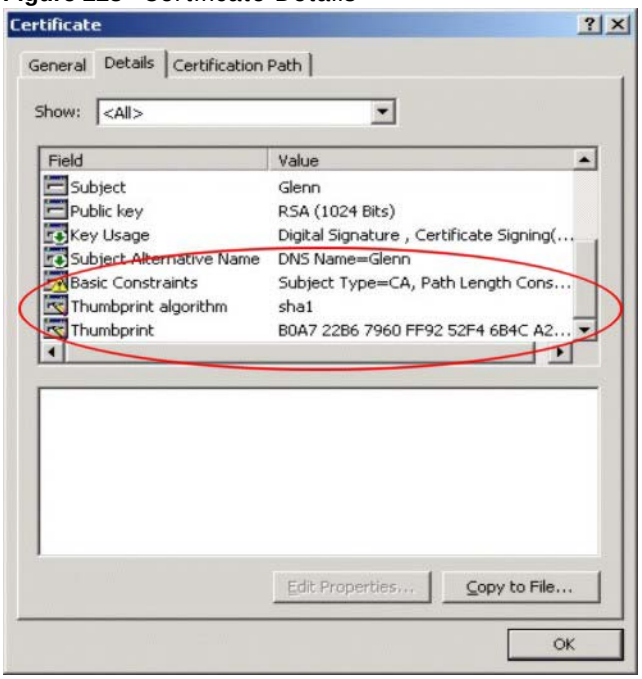
2 Make sure that the certificate has a ".cer" or ".crt" file name extension.

Figure 222 Remote Host Certificates



3 Double-click the certificate's icon to open the **Certificate** window. Click the **Details** tab and scroll down to the **Thumbprint Algorithm** and **Thumbprint** fields.

Figure 223 Certificate Details

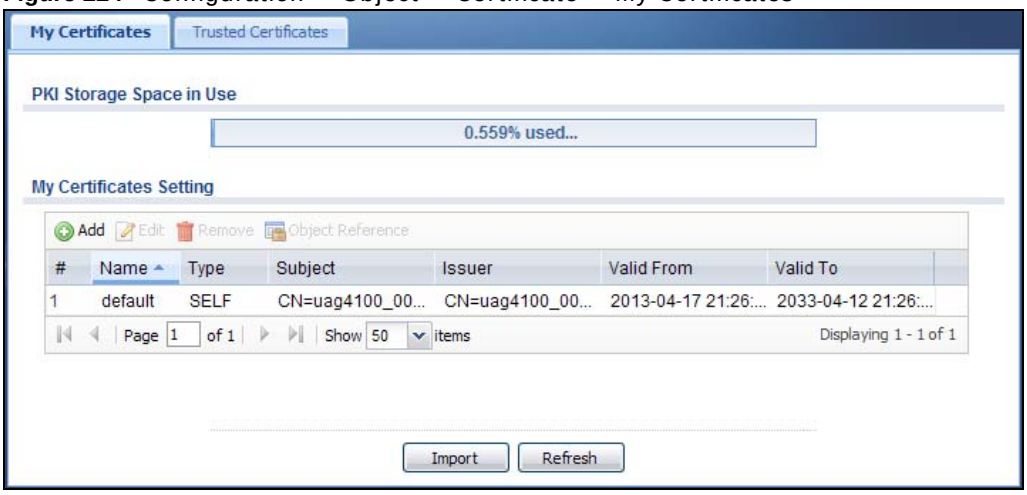


4 Use a secure method to verify that the certificate owner has the same information in the **Thumbprint Algorithm** and **Thumbprint** fields. The secure method may very based on your situation. Possible examples would be over the telephone or through an HTTPS connection.

37.2 The My Certificates Screen

Click **Configuration > Object > Certificate > My Certificates** to open the **My Certificates** screen. This is the UAG's summary list of certificates and certification requests.

Figure 224 Configuration > Object > Certificate > My Certificates



The following table describes the labels in this screen.

Table 168 Configuration > Object > Certificate > My Certificates

LABEL	DESCRIPTION
PKI Storage Space in Use	This bar displays the percentage of the UAG's PKI storage space that is currently in use. When the storage space is almost full, you should consider deleting expired or unnecessary certificates before adding more certificates.
Add	Click this to go to the screen where you can have the UAG generate a certificate or a certification request.
Edit	Double-click an entry or select it and click **Edit** to open a screen with an in-depth list of information about the certificate.
Remove	The UAG keeps all of your certificates unless you specifically delete them. Uploading a new firmware or default configuration file does not delete your certificates. To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Subsequent certificates move up by one when you take this action.
Object Reference	You cannot delete certificates that any of the UAG's features are configured to use. Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field displays the certificate index number. The certificates are listed in alphabetical order.
Name	This field displays the name used to identify this certificate. It is recommended that you give each certificate a unique name.

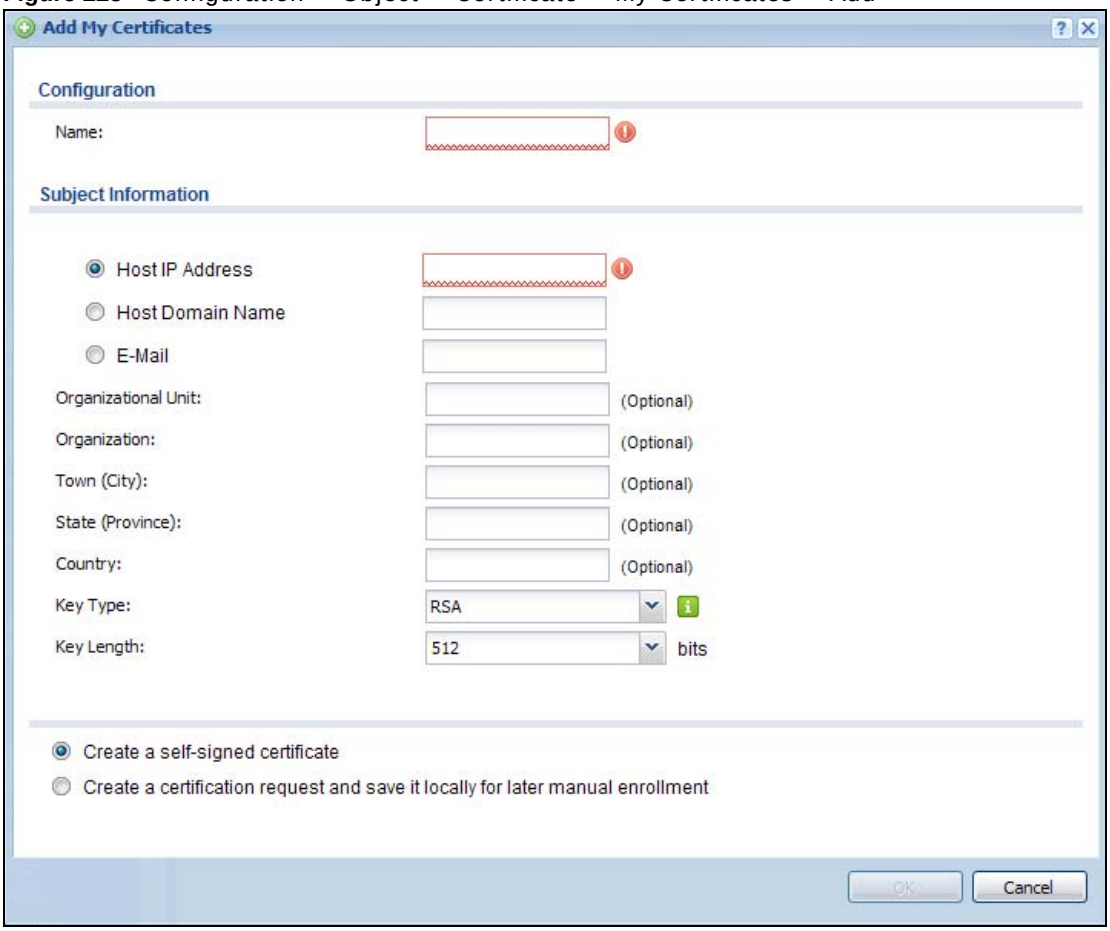
Table 168 Configuration > Object > Certificate > My Certificates (continued)

LABEL	DESCRIPTION
Type	This field displays what kind of certificate this is. **REQ** represents a certification request and is not yet a valid certificate. Send a certification request to a certification authority, which then issues a certificate. Use the **My Certificate Import** screen to import the certificate and replace the request. **SELF** represents a self-signed certificate. **CERT** represents a certificate issued by a certification authority.
Subject	This field displays identifying information about the certificate's owner, such as CN (Common Name), OU (Organizational Unit or department), O (Organization or company) and C (Country). It is recommended that each certificate have unique subject information.
Issuer	This field displays identifying information about the certificate's issuing certification authority, such as a common name, organizational unit or department, organization or company and country. With self-signed certificates, this is the same information as in the **Subject** field.
Valid From	This field displays the date that the certificate becomes applicable.
Valid To	This field displays the date that the certificate expires. The text displays in red and includes an Expired! message if the certificate has expired.
Import	Click **Import** to open a screen where you can save a certificate to the UAG.
Refresh	Click **Refresh** to display the current validity status of the certificates.

37.2.1 The My Certificates Add Screen

Click **Configuration > Object > Certificate > My Certificates** and then the **Add** icon to open the **My Certificates Add** screen. Use this screen to have the UAG create a self-signed certificate, enroll a certificate with a certification authority or generate a certification request.

Figure 225 Configuration > Object > Certificate > My Certificates > Add



The following table describes the labels in this screen.

Table 169 Configuration > Object > Certificate > My Certificates > Add

LABEL	DESCRIPTION
Name	Type a name to identify this certificate. You can use up to 31 alphanumeric and ;'~!@#$%^&()_+[]{}',.=- characters.
Subject Information	Use these fields to record information that identifies the owner of the certificate. You do not have to fill in every field, although you must specify a **Host IP Address**, **Host Domain Name**, or **E-Mail**. The certification authority may add fields (such as a serial number) to the subject information when it issues a certificate. It is recommended that each certificate have unique subject information. Select a radio button to identify the certificate's owner by IP address, domain name or e-mail address. Type the IP address (in dotted decimal notation), domain name or e-mail address in the field provided. The domain name or e-mail address is for identification purposes only and can be any string. A domain name can be up to 255 characters. You can use alphanumeric characters, the hyphen and periods. An e-mail address can be up to 63 characters. You can use alphanumeric characters, the hyphen, the @ symbol, periods and the underscore.
Organizational Unit	Identify the organizational unit or department to which the certificate owner belongs. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.

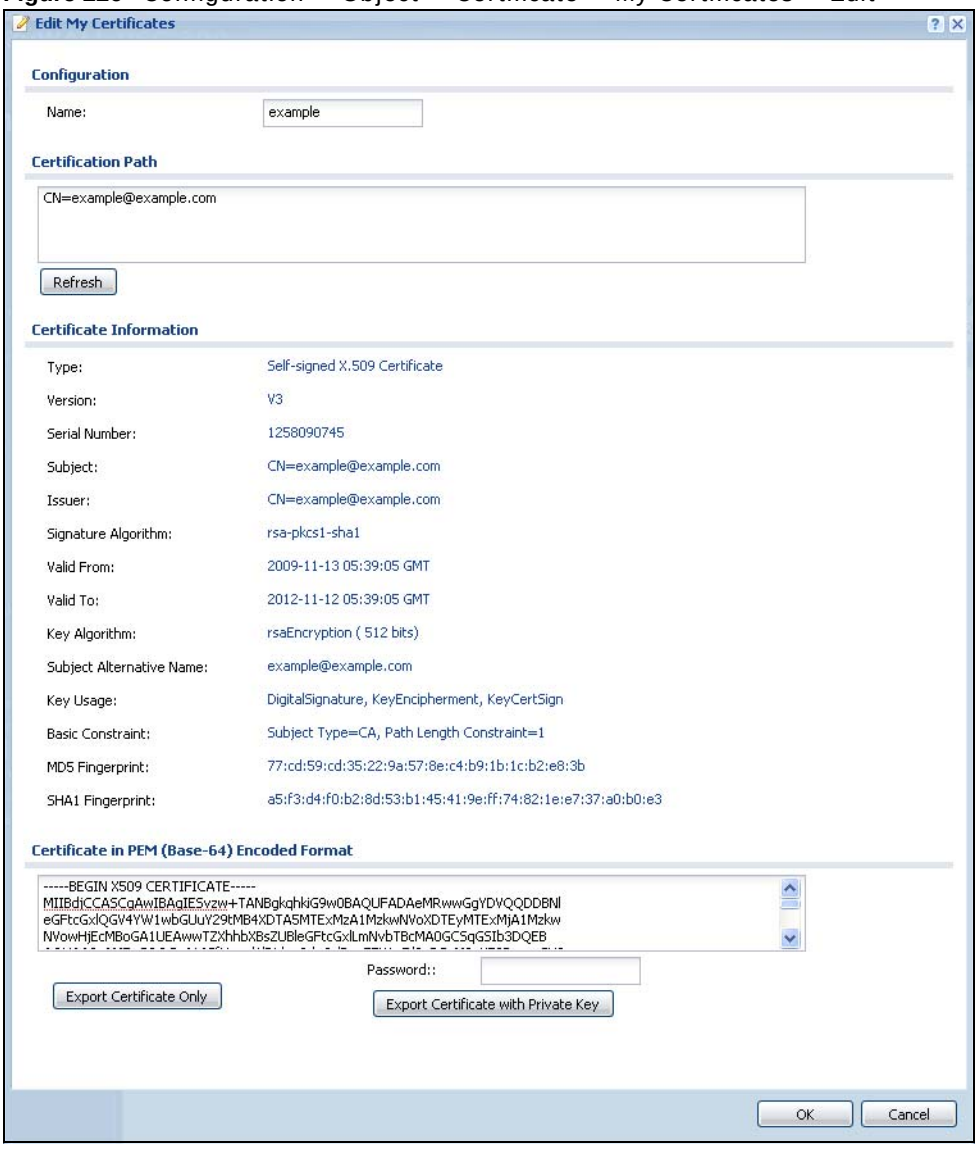
Table 169 Configuration > Object > Certificate > My Certificates > Add (continued)

LABEL	DESCRIPTION
Organization	Identify the company or group to which the certificate owner belongs. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
Town (City)	Identify the town or city where the certificate owner is located. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
State (Province)	Identify the state or province where the certificate owner is located. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
Country	Identify the nation where the certificate owner is located. You can use up to 31 characters. You can use alphanumeric characters, the hyphen and the underscore.
Key Type	Select **RSA** to use the Rivest, Shamir and Adleman public-key algorithm. Select **DSA** to use the Digital Signature Algorithm public-key algorithm.
Key Length	Select a number from the drop-down list box to determine how many bits the key should use (512 to 2048). The longer the key, the more secure it is. A longer key also uses more PKI storage space.
Enrollment Options	These radio buttons deal with how and when the certificate is to be generated.
Create a self-signed certificate	Select this to have the UAG generate the certificate and act as the Certification Authority (CA) itself. This way you do not need to apply to a certification authority for certificates.
Create a certification request and save it locally for later manual enrollment	Select this to have the UAG generate and store a request for a certificate. Use the **My Certificate Details** screen to view the certification request and copy it to send to the certification authority. Copy the certification request from the **My Certificate Details** screen (see Section 37.2.2 on page 331) and then send it to the certification authority.
OK	Click **OK** to begin certificate or certification request generation.
Cancel	Click **Cancel** to quit and return to the **My Certificates** screen.

37.2.2 The My Certificates Edit Screen

Click **Configuration > Object > Certificate > My Certificates** and then the **Edit** icon to open the **My Certificate Edit** screen. You can use this screen to view in-depth certificate information and change the certificate's name.

Figure 226 Configuration > Object > Certificate > My Certificates > Edit



The following table describes the labels in this screen.

Table 170 Configuration > Object > Certificate > My Certificates > Edit

LABEL	DESCRIPTION
Name	This field displays the identifying name of this certificate. You can use up to 31 alphanumeric and ;'~!@#$%^&()_+[]{},.=- characters.
Certification Path	This field displays for a certificate, not a certification request. Click the **Refresh** button to have this read-only text box display the hierarchy of certification authorities that validate the certificate (and the certificate itself). If the issuing certification authority is one that you have imported as a trusted certification authority, it may be the only certification authority in the list (along with the certificate itself). If the certificate is a self-signed certificate, the certificate itself is the only one in the list. The UAG does not trust the certificate and displays "Not trusted" in this field if any certificate on the path has expired or been revoked.
Refresh	Click **Refresh** to display the certification path.

Table 170 Configuration > Object > Certificate > My Certificates > Edit (continued)

LABEL	DESCRIPTION
Certificate Information	These read-only fields display detailed information about the certificate.
Type	This field displays general information about the certificate. CA-signed means that a Certification Authority signed the certificate. Self-signed means that the certificate's owner signed the certificate (not a certification authority). "X.509" means that this certificate was created and signed according to the ITU-T X.509 recommendation that defines the formats for public-key certificates.
Version	This field displays the X.509 version number.
Serial Number	This field displays the certificate's identification number given by the certification authority or generated by the UAG.
Subject	This field displays information that identifies the owner of the certificate, such as Common Name (CN), Organizational Unit (OU), Organization (O), State (ST), and Country (C).
Issuer	This field displays identifying information about the certificate's issuing certification authority, such as Common Name, Organizational Unit, Organization and Country. With self-signed certificates, this is the same as the **Subject Name** field. "none" displays for a certification request.
Signature Algorithm	This field displays the type of algorithm that was used to sign the certificate. The UAG uses rsa-pkcs1-sha1 (RSA public-private key encryption algorithm and the SHA1 hash algorithm). Some certification authorities may use rsa-pkcs1-md5 (RSA public-private key encryption algorithm and the MD5 hash algorithm).
Valid From	This field displays the date that the certificate becomes applicable. "none" displays for a certification request.
Valid To	This field displays the date that the certificate expires. The text displays in red and includes an Expired! message if the certificate has expired. "none" displays for a certification request.
Key Algorithm	This field displays the type of algorithm that was used to generate the certificate's key pair (the UAG uses RSA encryption) and the length of the key set in bits (1024 bits for example).
Subject Alternative Name	This field displays the certificate owner's IP address (IP), domain name (DNS) or e-mail address (EMAIL).
Key Usage	This field displays for what functions the certificate's key can be used. For example, "DigitalSignature" means that the key can be used to sign certificates and "KeyEncipherment" means that the key can be used to encrypt text.
Basic Constraint	This field displays general information about the certificate. For example, Subject Type=CA means that this is a certification authority's certificate and "Path Length Constraint=1" means that there can only be one certification authority in the certificate's path. This field does not display for a certification request.
MD5 Fingerprint	This is the certificate's message digest that the UAG calculated using the MD5 algorithm.
SHA1 Fingerprint	This is the certificate's message digest that the UAG calculated using the SHA1 algorithm.
Certificate in PEM (Base-64) Encoded Format	This read-only text box displays the certificate or certification request in Privacy Enhanced Mail (PEM) format. PEM uses lowercase letters, uppercase letters and numerals to convert a binary certificate into a printable form. You can copy and paste a certification request into a certification authority's web page, an e-mail that you send to the certification authority or a text editor and save the file on a management computer for later manual enrollment. You can copy and paste a certificate into an e-mail to send to friends or colleagues or you can copy and paste a certificate into a text editor and save the file on a management computer for later distribution (via floppy disk for example).

Table 170 Configuration > Object > Certificate > My Certificates > Edit (continued)

LABEL	DESCRIPTION
Export Certificate Only	Use this button to save a copy of the certificate without its private key. Click this button and then **Save** in the **File Download** screen. The **Save As** screen opens, browse to the location that you want to use and click **Save**.
Password	If you want to export the certificate with its private key, create a password and type it here. Make sure you keep this password in a safe place. You will need to use it if you import the certificate to another device.
Export Certificate with Private Key	Use this button to save a copy of the certificate with its private key. Type the certificate's password and click this button. Click **Save** in the **File Download** screen. The **Save As** screen opens, browse to the location that you want to use and click **Save**.
OK	Click **OK** to save your changes back to the UAG. You can only change the name.
Cancel	Click **Cancel** to quit and return to the **My Certificates** screen.

37.2.3 The My Certificates Import Screen

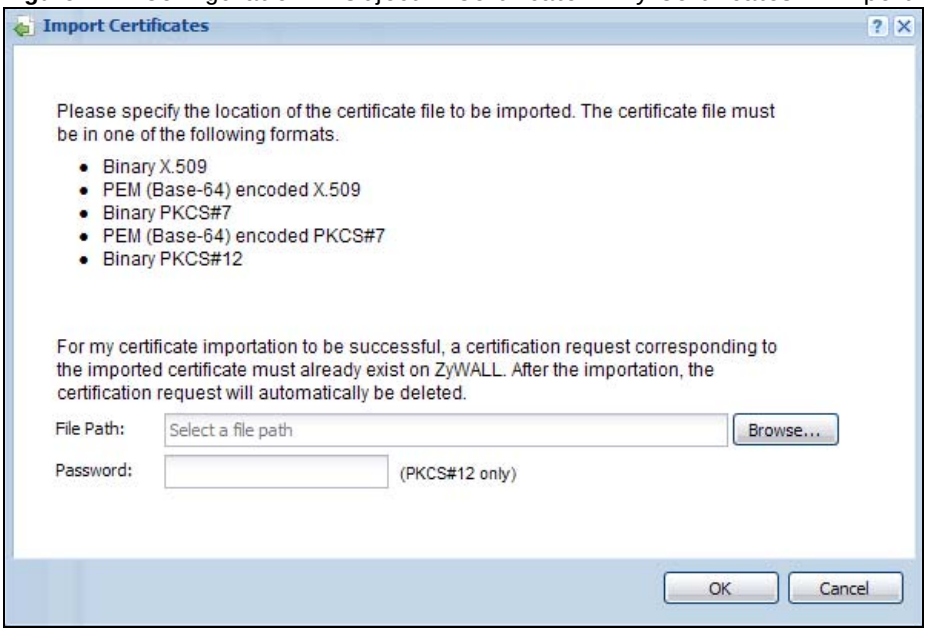
Click **Configuration > Object > Certificate > My Certificates > Import** to open the **My Certificate Import** screen. Follow the instructions in this screen to save an existing certificate to the UAG.

Note: You can import a certificate that matches a corresponding certification request that was generated by the UAG. You can also import a certificate in PKCS#12 format, including the certificate's public and private keys.

The certificate you import replaces the corresponding request in the **My Certificates** screen.

You must remove any spaces from the certificate's filename before you can import it.

Figure 227 Configuration > Object > Certificate > My Certificates > Import



The following table describes the labels in this screen.

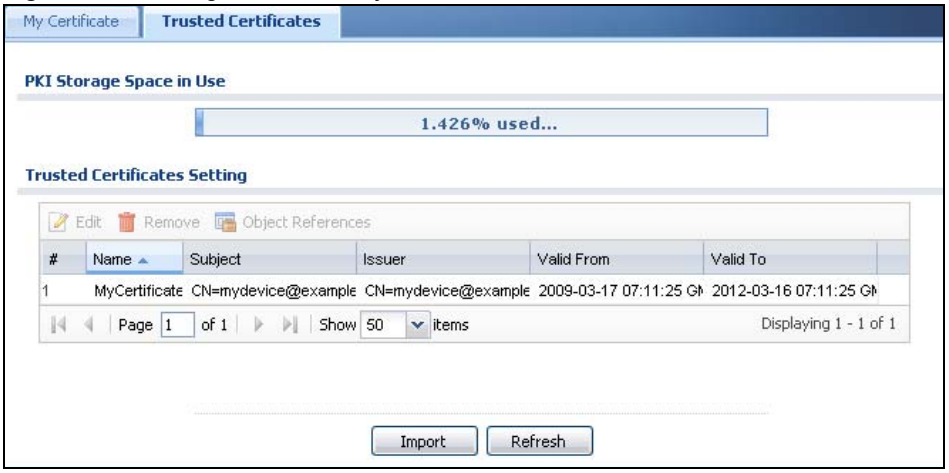
Table 171 Configuration > Object > Certificate > My Certificates > Import

LABEL	DESCRIPTION
File Path	Type in the location of the file you want to upload in this field or click **Browse** to find it. You cannot import a certificate with the same name as a certificate that is already in the UAG.
Browse	Click **Browse** to find the certificate file you want to upload.
Password	This field only applies when you import a binary PKCS#12 format file. Type the file's password that was created when the PKCS #12 file was exported.
OK	Click **OK** to save the certificate on the UAG.
Cancel	Click **Cancel** to quit and return to the **My Certificates** screen.

37.3 The Trusted Certificates Screen

Click **Configuration > Object > Certificate > Trusted Certificates** to open the **Trusted Certificates** screen. This screen displays a summary list of certificates that you have set the UAG to accept as trusted. The UAG also accepts any valid certificate signed by a certificate on this list as being trustworthy; thus you do not need to import any certificate that is signed by one of these certificates.

Figure 228 Configuration > Object > Certificate > Trusted Certificates



The following table describes the labels in this screen.

Table 172 Configuration > Object > Certificate > Trusted Certificates

LABEL	DESCRIPTION
PKI Storage Space in Use	This bar displays the percentage of the UAG's PKI storage space that is currently in use. When the storage space is almost full, you should consider deleting expired or unnecessary certificates before adding more certificates.
Edit	Double-click an entry or select it and click **Edit** to open a screen with an in-depth list of information about the certificate.
Remove	The UAG keeps all of your certificates unless you specifically delete them. Uploading a new firmware or default configuration file does not delete your certificates. To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Subsequent certificates move up by one when you take this action.

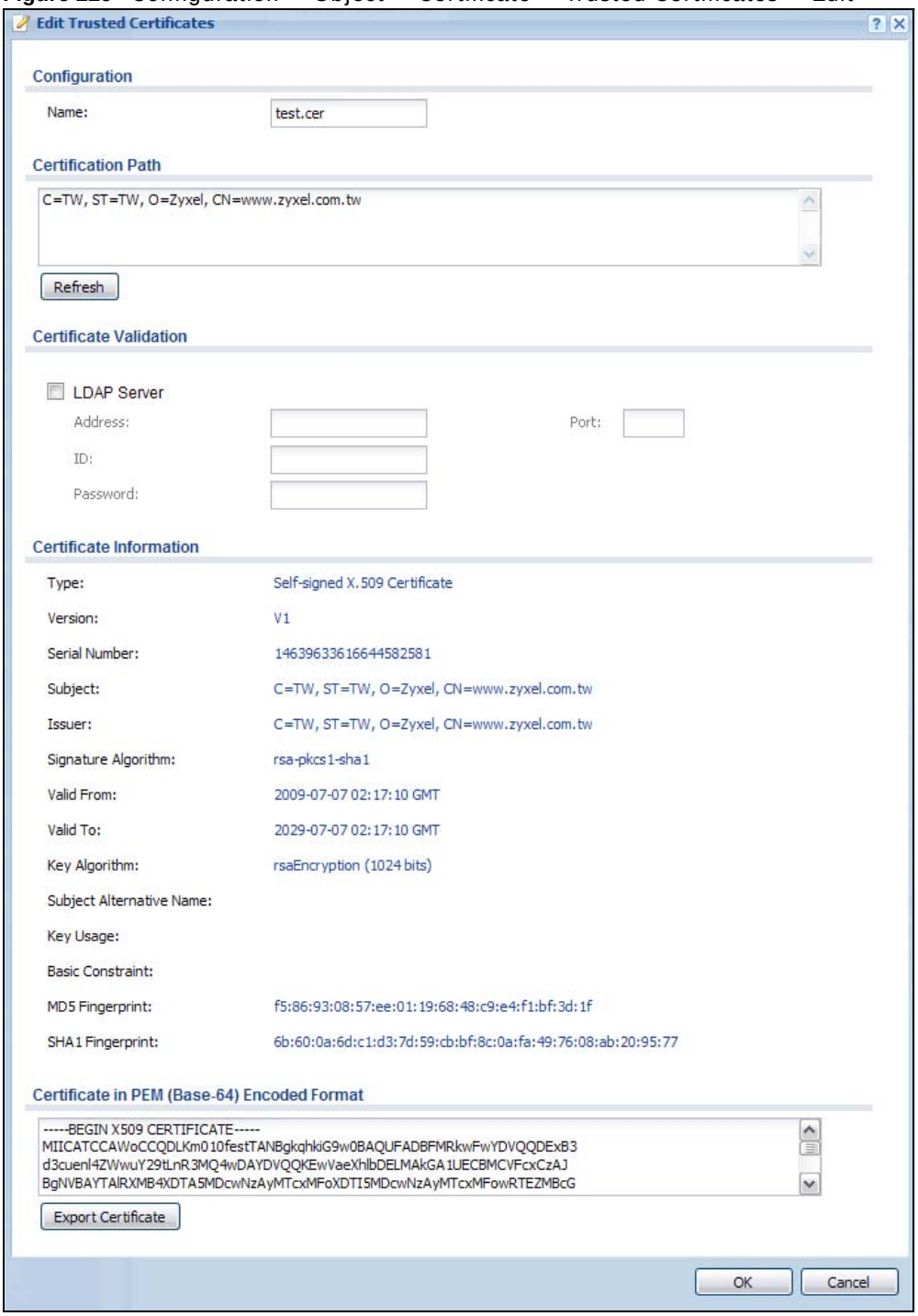
Table 172 Configuration > Object > Certificate > Trusted Certificates (continued)

LABEL	DESCRIPTION
Object Reference	You cannot delete certificates that any of the UAG's features are configured to use. Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.
#	This field displays the certificate index number. The certificates are listed in alphabetical order.
Name	This field displays the name used to identify this certificate.
Subject	This field displays identifying information about the certificate's owner, such as CN (Common Name), OU (Organizational Unit or department), O (Organization or company) and C (Country). It is recommended that each certificate have unique subject information.
Issuer	This field displays identifying information about the certificate's issuing certification authority, such as a common name, organizational unit or department, organization or company and country. With self-signed certificates, this is the same information as in the **Subject** field.
Valid From	This field displays the date that the certificate becomes applicable.
Valid To	This field displays the date that the certificate expires. The text displays in red and includes an Expired! message if the certificate has expired.
Import	Click **Import** to open a screen where you can save the certificate of a certification authority that you trust, from your computer to the UAG.
Refresh	Click this button to display the current validity status of the certificates.

37.3.1 The Trusted Certificates Edit Screen

Click **Configuration > Object > Certificate > Trusted Certificates** and then a certificate's **Edit** icon to open the **Trusted Certificates Edit** screen. Use this screen to view in-depth information about the certificate, change the certificate's name and set whether or not you want the UAG to check a certification authority's list of revoked certificates before trusting a certificate issued by the certification authority.

Figure 229 Configuration > Object > Certificate > Trusted Certificates > Edit



The following table describes the labels in this screen.

Table 173 Configuration > Object > Certificate > Trusted Certificates > Edit

LABEL	DESCRIPTION
Name	This field displays the identifying name of this certificate. You can change the name. You can use up to 31 alphanumeric and ;'~!@#$%^&()_+[]{}',.=- characters.
Certification Path	Click the **Refresh** button to have this read-only text box display the end entity's certificate and a list of certification authority certificates that shows the hierarchy of certification authorities that validate the end entity's certificate. If the issuing certification authority is one that you have imported as a trusted certificate, it may be the only certification authority in the list (along with the end entity's own certificate). The UAG does not trust the end entity's certificate and displays "Not trusted" in this field if any certificate on the path has expired or been revoked.
Refresh	Click **Refresh** to display the certification path.
LDAP Server	Select this check box if the directory server uses LDAP (Lightweight Directory Access Protocol). LDAP is a protocol over TCP that specifies how clients access directories of certificates and lists of revoked certificates.
Address	Type the IP address (in dotted decimal notation) of the directory server.
Port	Use this field to specify the LDAP server port number. You must use the same server port number that the directory server uses. 389 is the default server port number for LDAP.
ID	The UAG may need to authenticate itself in order to assess the CRL directory server. Type the login name (up to 31 ASCII characters) from the entity maintaining the server (usually a certification authority).
Password	Type the password (up to 31 ASCII characters) from the entity maintaining the CRL directory server (usually a certification authority).
Certificate Information	These read-only fields display detailed information about the certificate.
Type	This field displays general information about the certificate. CA-signed means that a Certification Authority signed the certificate. Self-signed means that the certificate's owner signed the certificate (not a certification authority). X.509 means that this certificate was created and signed according to the ITU-T X.509 recommendation that defines the formats for public-key certificates.
Version	This field displays the X.509 version number.
Serial Number	This field displays the certificate's identification number given by the certification authority.
Subject	This field displays information that identifies the owner of the certificate, such as Common Name (CN), Organizational Unit (OU), Organization (O) and Country (C).
Issuer	This field displays identifying information about the certificate's issuing certification authority, such as Common Name, Organizational Unit, Organization and Country. With self-signed certificates, this is the same information as in the **Subject Name** field.
Signature Algorithm	This field displays the type of algorithm that was used to sign the certificate. Some certification authorities use rsa-pkcs1-sha1 (RSA public-private key encryption algorithm and the SHA1 hash algorithm). Other certification authorities may use rsa-pkcs1-md5 (RSA public-private key encryption algorithm and the MD5 hash algorithm).
Valid From	This field displays the date that the certificate becomes applicable. The text displays in red and includes a Not Yet Valid! message if the certificate has not yet become applicable.
Valid To	This field displays the date that the certificate expires. The text displays in red and includes an Expiring! or Expired! message if the certificate is about to expire or has already expired.
Key Algorithm	This field displays the type of algorithm that was used to generate the certificate's key pair (the UAG uses RSA encryption) and the length of the key set in bits (1024 bits for example).

Table 173 Configuration > Object > Certificate > Trusted Certificates > Edit (continued)

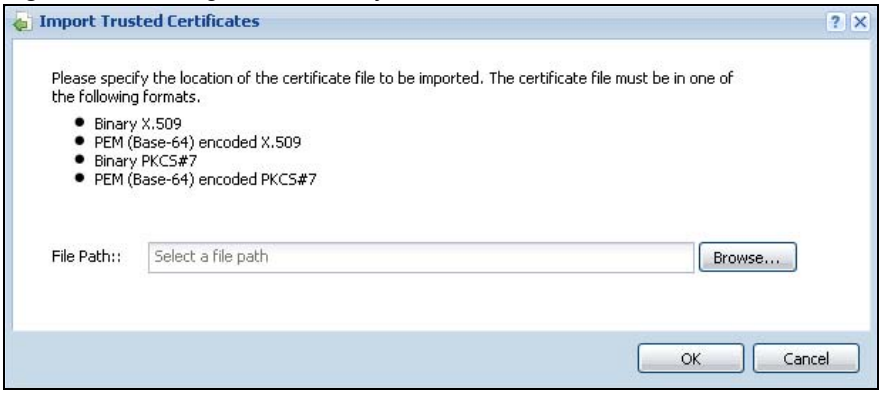
LABEL	DESCRIPTION
Subject Alternative Name	This field displays the certificate's owner's IP address (IP), domain name (DNS) or e-mail address (EMAIL).
Key Usage	This field displays for what functions the certificate's key can be used. For example, "DigitalSignature" means that the key can be used to sign certificates and "KeyEncipherment" means that the key can be used to encrypt text.
Basic Constraint	This field displays general information about the certificate. For example, Subject Type=CA means that this is a certification authority's certificate and "Path Length Constraint=1" means that there can only be one certification authority in the certificate's path.
MD5 Fingerprint	This is the certificate's message digest that the UAG calculated using the MD5 algorithm. You can use this value to verify with the certification authority (over the phone for example) that this is actually their certificate.
SHA1 Fingerprint	This is the certificate's message digest that the UAG calculated using the SHA1 algorithm. You can use this value to verify with the certification authority (over the phone for example) that this is actually their certificate.
Certificate in PEM (Base-64) Encoded Format	This read-only text box displays the certificate or certification request in Privacy Enhanced Mail (PEM) format. PEM uses lowercase letters, uppercase letters and numerals to convert a binary certificate into a printable form. You can copy and paste the certificate into an e-mail to send to friends or colleagues or you can copy and paste the certificate into a text editor and save the file on a management computer for later distribution (via floppy disk for example).
Export Certificate	Click this button and then **Save** in the **File Download** screen. The **Save As** screen opens, browse to the location that you want to use and click **Save**.
OK	Click **OK** to save your changes back to the UAG. You can only change the name.
Cancel	Click **Cancel** to quit and return to the **Trusted Certificates** screen.

37.3.2 The Trusted Certificates Import Screen

Click **Configuration > Object > Certificate > Trusted Certificates > Import** to open the **Trusted Certificates Import** screen. Follow the instructions in this screen to save a trusted certificate to the UAG.

Note: You must remove any spaces from the certificate's filename before you can import the certificate.

Figure 230 Configuration > Object > Certificate > Trusted Certificates > Import



The following table describes the labels in this screen.

Table 174 Configuration > Object > Certificate > Trusted Certificates > Import

LABEL	DESCRIPTION
File Path	Type in the location of the file you want to upload in this field or click **Browse** to find it. You cannot import a certificate with the same name as a certificate that is already in the UAG.
Browse	Click **Browse** to find the certificate file you want to upload.
OK	Click **OK** to save the certificate on the UAG.
Cancel	Click **Cancel** to quit and return to the previous screen.

38

ISP Accounts

38.1 Overview

Use ISP accounts to manage Internet Service Provider (ISP) account information for PPPoE/PPTP interfaces. An ISP account is a profile of settings for Internet access using PPPoE or PPTP.

Finding Out More

- See Section 9.4 on page 111 for information about PPPoE/PPTP interfaces.

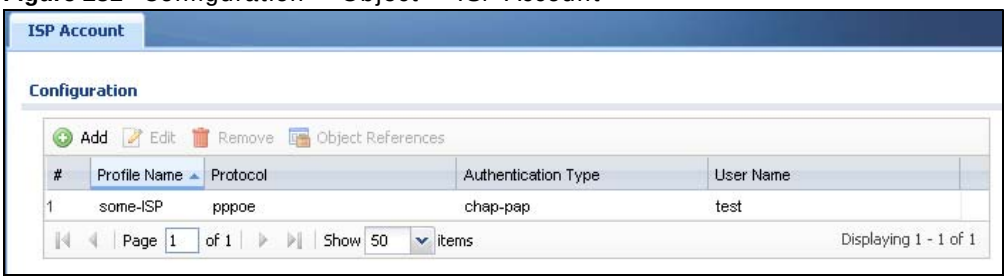
38.1.1 What You Can Do in this Chapter

Use the **Object** > **ISP Account** screens (Section 38.2 on page 341) to create and manage ISP accounts in the UAG.

38.2 ISP Account Summary

This screen provides a summary of ISP accounts in the UAG. To access this screen, click **Configuration > Object** > **ISP Account**.

Figure 231 Configuration > Object > ISP Account



The following table describes the labels in this screen. See the ISP Account Edit section below for more information as well.

Table 175 Configuration > Object > ISP Account

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 108 for an example.

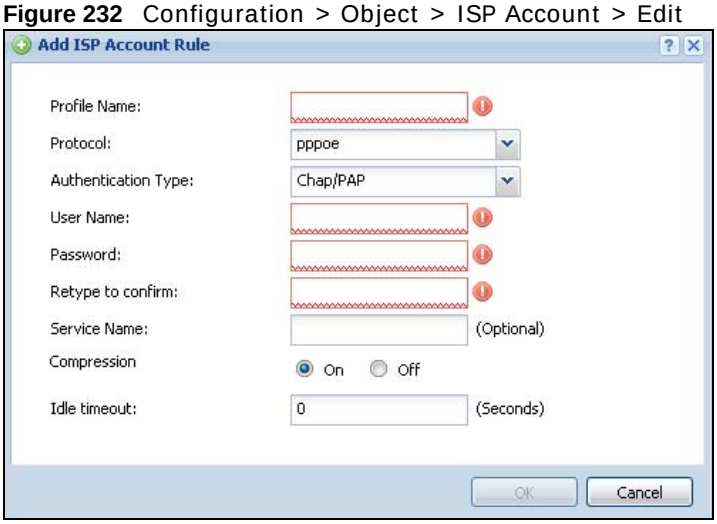
Table 175 Configuration > Object > ISP Account (continued)

LABEL	DESCRIPTION
#	This field is a sequential value, and it is not associated with a specific entry.
Profile Name	This field displays the profile name of the ISP account. This name is used to identify the ISP account.
Protocol	This field displays the protocol used by the ISP account.
Authentication Type	This field displays the authentication type used by the ISP account.
User Name	This field displays the user name of the ISP account.

38.2.1 ISP Account Edit

The **ISP Account Edit** screen lets you add information about new accounts and edit information about existing accounts. To open this window, open the **ISP Account** screen. (See Section 38.2 on page 341.) Then, click on an **Add** icon or **Edit** icon to open the **ISP Account Edit** screen below.

Figure 232 Configuration > Object > ISP Account > Edit



The following table describes the labels in this screen.

Table 176 Configuration > Object > ISP Account > Edit

LABEL	DESCRIPTION
Profile Name	This field is read-only if you are editing an existing account. Type in the profile name of the ISP account. The profile name is used to refer to the ISP account. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Protocol	This field is read-only if you are editing an existing account. Select the protocol used by the ISP account. Options are: **pppoe** - This ISP account uses the PPPoE protocol. **pptp** - This ISP account uses the PPTP protocol.

Table 176 Configuration > Object > ISP Account > Edit (continued)

LABEL	DESCRIPTION
Authentication Type	Use the drop-down list box to select an authentication protocol for outgoing calls. Options are: **CHAP/PAP** - Your UAG accepts either CHAP or PAP when requested by this remote node. **Chap** - Your UAG accepts CHAP only. **PAP** - Your UAG accepts PAP only. **MSCHAP** - Your UAG accepts MSCHAP only. **MSCHAP-V2** - Your UAG accepts MSCHAP-V2 only.
Encryption Method	This field is available if this ISP account uses the **PPTP** protocol. Use the drop-down list box to select the type of Microsoft Point-to-Point Encryption (MPPE). Options are: **nomppe** - This ISP account does not use MPPE. **mppe-40** - This ISP account uses 40-bit MPPE. **mppe-128** - This ISP account uses 128-bit MMPE.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above. The password can only consist of alphanumeric characters (A-Z, a-z, 0-9). This field can be blank.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.
Server IP	If this ISP account uses the PPPoE protocol, this field is not displayed. If this ISP account uses the PPTP protocol, type the IP address of the PPTP server.
Connection ID	This field is available if this ISP account uses the **PPTP** protocol. Type your identification name for the PPTP server. This field can be blank.
Service Name	If this ISP account uses the PPPoE protocol, type the PPPoE service name to access. PPPoE uses the specified service name to identify and reach the PPPoE server. This field can be blank. If this ISP account uses the PPTP protocol, this field is not displayed.
Compression	Select **On** button to turn on stac compression, and select **Off** to turn off stac compression. Stac compression is a data compression technique capable of compressing data by a factor of about four.
Idle Timeout	This value specifies the number of seconds that must elapse without outbound traffic before the UAG automatically disconnects from the PPPoE/PPTP server. This value must be an integer between 0 and 360. If this value is zero, this timeout is disabled.
OK	Click **OK** to save your changes back to the UAG. If there are no errors, the program returns to the **ISP Account** screen. If there are errors, a message box explains the error, and the program stays in the **ISP Account Edit** screen.
Cancel	Click **Cancel** to return to the **ISP Account** screen without creating the profile (if it is new) or saving any changes to the profile (if it already exists).

39

System

39.1 Overview

Use the system screens to configure general UAG settings.

39.1.1 What You Can Do in this Chapter

- Use the **System > Host Name** screen (see Section 39.2 on page 345) to configure a unique name for the UAG in your network.
- Use the **System > USB Storage** screen (see Section 39.3 on page 345) to configure the settings for the connected USB devices.
- Use the **System > Date/Time** screen (see Section 39.4 on page 346) to configure the date and time for the UAG.
- Use the **System > Console Speed** screen (see Section 39.5 on page 350) to configure the console port speed when you connect to the UAG via the console port using a terminal emulation program.
- Use the **System > DNS** screen (see Section 39.6 on page 351) to configure the DNS (Domain Name System) server used for mapping a domain name to its corresponding IP address and vice versa.
- Use the **System > WWW** screens (see Section 39.7 on page 357) to configure settings for HTTP or HTTPS access to the UAG and how the login and access user screens look.
- Use the **System > SSH** screen (see Section 39.8 on page 373) to configure SSH (Secure SHell) used to securely access the UAG's command line interface. You can specify which zones allow SSH access and from which IP address the access can come.
- Use the **System > TELNET** screen (see Section 39.9 on page 378) to configure Telnet to access the UAG's command line interface. Specify which zones allow Telnet access and from which IP address the access can come.
- Use the **System > FTP** screen (see Section 39.10 on page 379) to specify from which zones FTP can be used to access the UAG. You can also specify from which IP addresses the access can come. You can upload and download the UAG's firmware and configuration files using FTP. Please also see Chapter 41 on page 400 for more information about firmware and configuration files.
- Your UAG can act as an SNMP agent, which allows a manager station to manage and monitor the UAG through the network. Use the **System > SNMP** screen (see Section 39.11 on page 380) to configure SNMP settings, including from which zones SNMP can be used to access the UAG. You can also specify from which IP addresses the access can come.
- The **Language** screen (Section 39.12 on page 384) sets the user interface language for the UAG's Web Configurator screens.

Note: See each section for related background information and term definitions.

39.2 Host Name

A host name is the unique name by which a device is known on a network. Click **Configuration > System > Host Name** to open the **Host Name** screen.

Figure 233 Configuration > System > Host Name

The following table describes the labels in this screen.

Table 177 Configuration > System > Host Name

LABEL	DESCRIPTION
System Name	Enter a descriptive name to identify your UAG device. This name can be up to 64 alphanumeric characters long. Spaces are not allowed, but dashes (-) underscores (_) and periods (.) are accepted.
Domain Name	Enter the domain name (if you know it) here. This name is propagated to DHCP clients connected to interfaces with the DHCP server enabled. This name can be up to 254 alphanumeric characters long. Spaces are not allowed, but dashes "-" are accepted.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

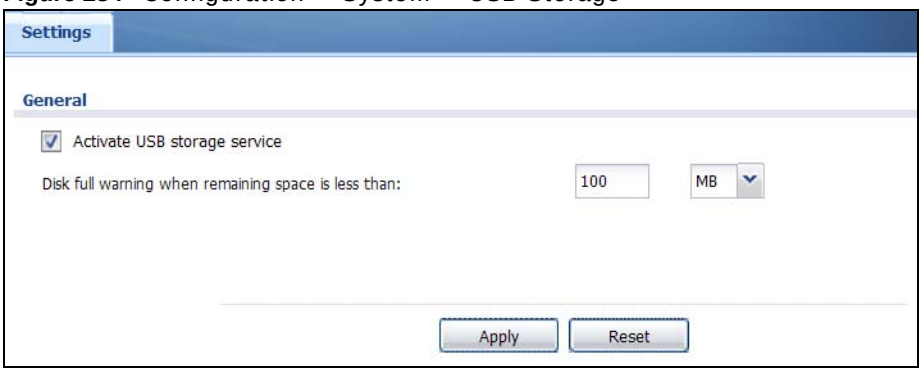
39.3 USB Storage

The UAG can use a connected USB device to store the system log and other diagnostic information. Use this screen to turn on this feature and set a disk full warning limit.

Note: Only connect one USB device. It must allow writing (it cannot be read-only) and use the FAT16, FAT32, EXT2, or EXT3 file system.

Click **Configuration > System > USB Storage** to open the screen as shown next.

Figure 234 Configuration > System > USB Storage



The following table describes the labels in this screen.

Table 178 Configuration > System > USB Storage

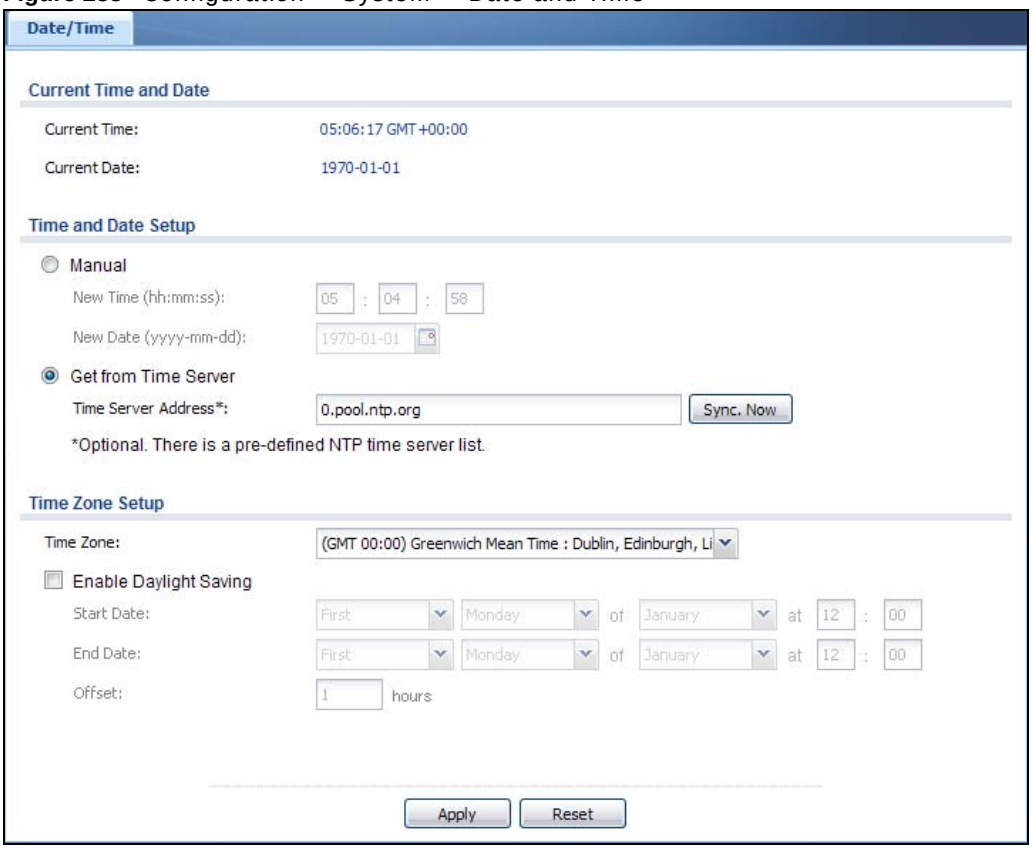
LABEL	DESCRIPTION
Activate USB storage service	Select this if you want to use the connected USB device(s).
Disk full warning when remaining space is less than	Set a number and select a unit (**MB** or **%**) to have the UAG send a warning message when the remaining USB storage space is less than the value you set here.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.4 Date and Time

For effective scheduling and logging, the UAG system time must be accurate. The UAG's Real Time Chip (RTC) keeps track of the time and date. There is also a software mechanism to set the time manually or get the current time and date from an external server.

To change your UAG's time based on your local time zone and date, click **Configuration > System > Date/Time**. The screen displays as shown. You can manually set the UAG's time and date or have the UAG get the date and time from a time server.

Figure 235 Configuration > System > Date and Time



The following table describes the labels in this screen.

Table 179 Configuration > System > Date and Time

LABEL	DESCRIPTION
Current Time and Date	
Current Time	This field displays the present time of your UAG.
Current Date	This field displays the present date of your UAG.
Time and Date Setup	
Manual	Select this radio button to enter the time and date manually. If you configure a new time and date, time zone and daylight saving at the same time, the time zone and daylight saving will affect the new time and date you entered. When you enter the time settings manually, the UAG uses the new setting once you click **Apply**.
New Time (hh-mm-ss)	This field displays the last updated time from the time server or the last time configured manually. When you set **Time and Date Setup** to **Manual**, enter the new time in this field and then click **Apply**.
New Date (yyyy-mm-dd)	This field displays the last updated date from the time server or the last date configured manually. When you set **Time and Date Setup** to **Manual**, enter the new date in this field and then click **Apply**.

Table 179 Configuration > System > Date and Time (continued)

LABEL	DESCRIPTION
Get from Time Server	Select this radio button to have the UAG get the time and date from the time server you specify below. The UAG requests time and date settings from the time server under the following circumstances. • When the UAG starts up. • When you click **Apply** or **Sync. Now** in this screen. • 24-hour intervals after starting up.
Time Server Address	Enter the IP address or URL of your time server. Check with your ISP/network administrator if you are unsure of this information.
Sync. Now	Click this button to have the UAG get the time and date from a time server (see the **Time Server Address** field). This also saves your changes (except the daylight saving settings).
Time Zone Setup	
Time Zone	Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Enable Daylight Saving	Daylight saving is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening. Select this option if you use Daylight Saving Time.
Start Date	Configure the day and time when Daylight Saving Time starts if you selected **Enable Daylight Saving**. The **at** field uses the 24 hour format. Here are a couple of examples: Daylight Saving Time starts in most parts of the United States on the second Sunday of March. Each time zone in the United States starts using Daylight Saving Time at 2 A.M. local time. So in the United States you would select **Second**, **Sunday**, **March** and type 2 in the **at** field. Daylight Saving Time starts in the European Union on the last Sunday of March. All of the time zones in the European Union start using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would select **Last**, **Sunday**, **March**. The time you type in the **at** field depends on your time zone. In Germany for instance, you would type 2 because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
End Date	Configure the day and time when Daylight Saving Time ends if you selected **Enable Daylight Saving**. The **at** field uses the 24 hour format. Here are a couple of examples: Daylight Saving Time ends in the United States on the first Sunday of November. Each time zone in the United States stops using Daylight Saving Time at 2 A.M. local time. So in the United States you would select **First**, **Sunday**, **November** and type 2 in the **at** field. Daylight Saving Time ends in the European Union on the last Sunday of October. All of the time zones in the European Union stop using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would select **Last**, **Sunday**, **October**. The time you type in the **at** field depends on your time zone. In Germany for instance, you would type 2 because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
Offset	Specify how much the clock changes when daylight saving begins and ends. Enter a number from 1 to 5.5 (by 0.5 increments). For example, if you set this field to 3.5, a log occurred at 6 P.M. in local official time will appear as if it had occurred at 10:30 P.M.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.4.1 Pre-defined NTP Time Servers List

When you turn on the UAG for the first time, the date and time start at 2003-01-01 00:00:00. The UAG then attempts to synchronize with one of the following pre-defined list of Network Time Protocol (NTP) time servers.

The UAG continues to use the following pre-defined list of NTP time servers if you do not specify a time server or it cannot synchronize with the time server you specified.

Table 180 Default Time Servers

0.pool.ntp.org
1.pool.ntp.org
2.pool.ntp.org

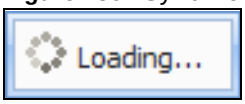
When the UAG uses the pre-defined list of NTP time servers, it randomly selects one server and tries to synchronize with it. If the synchronization fails, then the UAG goes through the rest of the list in order from the first one tried until either it is successful or all the pre-defined NTP time servers have been tried.

39.4.2 Time Server Synchronization

Click the **Synchronize Now** button to get the time and date from the time server you specified in the **Time Server Address** field.

When the **Loading...** screen appears, you may have to wait up to one minute.

Figure 236 Synchronization in Process



The **Current Time** and **Current Date** fields will display the appropriate settings if the synchronization is successful.

If the synchronization was not successful, a log displays in the **View Log** screen. Try re-configuring the **Date/Time** screen.

To manually set the UAG date and time.

1 Click **System > Date/Time**.

2 Select **Manual** under **Time and Date Setup**.

3 Enter the UAG's time in the **New Time** field.

4 Enter the UAG's date in the **New Date** field.

5 Under **Time Zone Setup**, select your **Time Zone** from the list.

6 As an option you can select the **Enable Daylight Saving** check box to adjust the UAG clock for daylight savings.

7 Click **Apply**.

To get the UAG date and time from a time server

1 Click **System > Date/Time**.

2 Select **Get from Time Server** under **Time and Date Setup**.

3 Under **Time Zone Setup**, select your **Time Zone** from the list.

4 As an option you can select the **Enable Daylight Saving** check box to adjust the UAG clock for daylight savings.

5 Under **Time and Date Setup**, enter a **Time Server Address** (Table 180 on page 349).

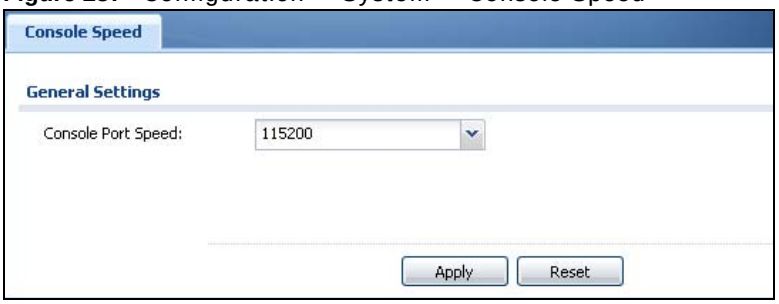
6 Click **Apply**.

39.5 Console Port Speed

This section shows you how to set the console port speed when you connect to the UAG via the console port using a terminal emulation program. See Table 1 on page 19 for default console port settings.

Click **Configuration > System > Console Speed** to open the **Console Speed** screen.

Figure 237 Configuration > System > Console Speed



The following table describes the labels in this screen.

Table 181 Configuration > System > Console Speed

LABEL	DESCRIPTION
Console Port Speed	Use the drop-down list box to change the speed of the console port. Your UAG supports 9600, 19200, 38400, 57600, and 115200 bps (default) for the console port. The **Console Port Speed** applies to a console port connection using terminal emulation software and NOT the **Console** in the UAG Web Configurator **Status** screen.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.6 DNS Overview

DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a machine before you can access it.

39.6.1 DNS Server Address Assignment

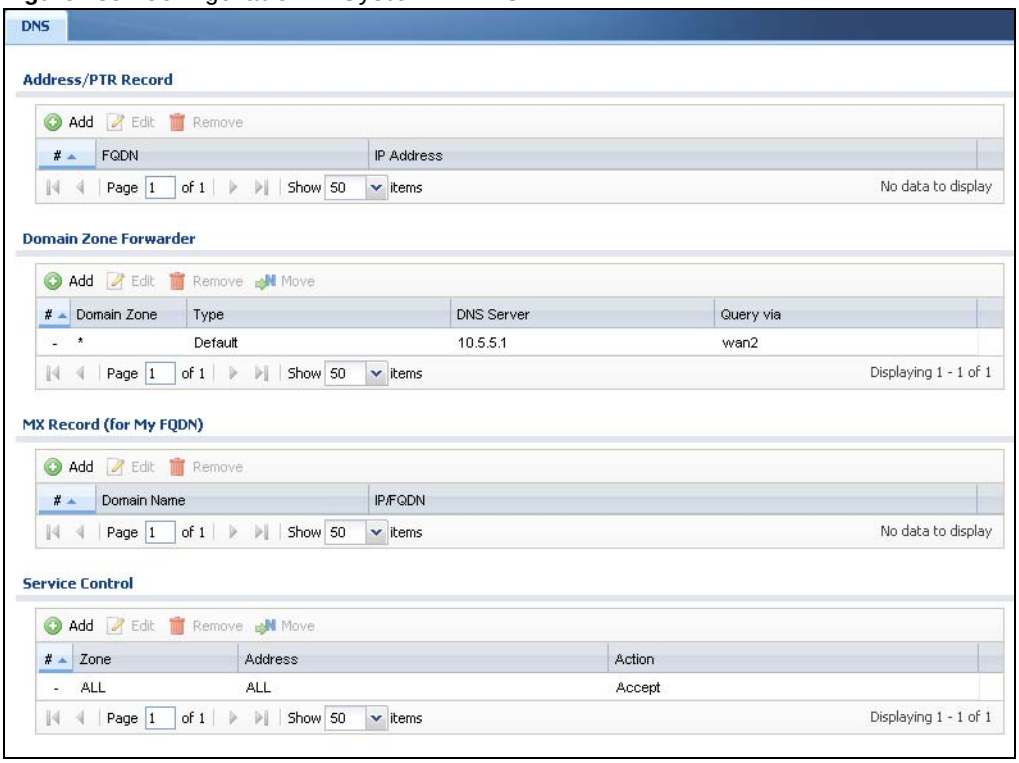
The UAG can get the DNS server addresses in the following ways.

- The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.
- If your ISP dynamically assigns the DNS server IP addresses (along with the UAG's WAN IP address), set the DNS server fields to get the DNS server address from the ISP.
- You can manually enter the IP addresses of other DNS servers.

39.6.2 Configuring the DNS Screen

Click **Configuration > System > DNS** to change your UAG's DNS settings. Use the **DNS** screen to configure the UAG to use a DNS server to resolve domain names for UAG system features like DDNS and the time server. You can also configure the UAG to accept or discard DNS queries. Use the **Network > Interface** screens to configure the DNS server information that the UAG sends to the specified DHCP client devices.

Figure 238 Configuration > System > DNS



The following table describes the labels in this screen.

Table 182 Configuration > System > DNS

LABEL	DESCRIPTION
Address/PTR Record	This record specifies the mapping of a Fully-Qualified Domain Name (FQDN) to an IP address. An FQDN consists of a host and domain name. For example, www.zyxel.com.tw is a fully qualified domain name, where “www” is the host, “zyxel” is the third-level domain, “com” is the second-level domain, and “tw” is the top level domain.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry’s settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
#	This is the index number of the address/PTR record.
FQDN	This is a host’s fully qualified domain name.
IP Address	This is the IP address of a host.
Domain Zone Forwarder	This specifies a DNS server’s IP address. The UAG can query the DNS server to resolve domain zones for features like DDNS and the time server. When the UAG needs to resolve a domain zone, it checks it against the domain zone forwarder entries in the order that they appear in this list.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry’s settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry’s position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This is the index number of the domain zone forwarder record. The ordering of your rules is important as rules are applied in sequence. A hyphen (-) displays for the default domain zone forwarder record. The default record is not configurable. The UAG uses this default record if the domain zone that needs to be resolved does not match any of the other domain zone forwarder records.
Domain Zone	A domain zone is a fully qualified domain name without the host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name. A “*” means all domain zones.
Type	This displays whether the DNS server IP address is assigned by the ISP dynamically through a specified interface or configured manually (**User-Defined**).
DNS Server	This is the IP address of a DNS server. This field displays **N/A** if you have the UAG get a DNS server IP address from the ISP dynamically but the specified interface is not active.
Query Via	This is the interface through which the UAG sends DNS queries to the entry’s DNS server.
MX Record (for My FQDN)	A MX (Mail eXchange) record identifies a mail server that handles the mail for a particular domain.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry’s settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
#	This is the index number of the MX record.
Domain Name	This is the domain name where the mail is destined for.
IP/FQDN	This is the IP address or Fully-Qualified Domain Name (FQDN) of a mail server that handles the mail for the domain specified in the field above.

Table 182 Configuration > System > DNS (continued)

LABEL	DESCRIPTION
Service Control	This specifies from which computers and zones you can send DNS queries to the UAG.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This the index number of the service control rule. The ordering of your rules is important as rules are applied in sequence. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to send DNS queries.
Action	This displays whether the UAG accepts DNS queries from the computer with the IP address specified above through the specified zone (**Accept**) or discards them (**Deny**).

39.6.3 Address Record

An address record contains the mapping of a Fully-Qualified Domain Name (FQDN) to an IP address. An FQDN consists of a host and domain name. For example, www.zyxel.com is a fully qualified domain name, where "www" is the host, "zyxel" is the second-level domain, and "com" is the top level domain. mail.myZyXEL.com.tw is also a FQDN, where "mail" is the host, "myZyXEL" is the third-level domain, "com" is the second-level domain, and "tw" is the top level domain.

The UAG allows you to configure address records about the UAG itself or another device. This way you can keep a record of DNS names and addresses that people on your network may use frequently. If the UAG receives a DNS query for an FQDN for which the UAG has an address record, the UAG can send the IP address in a DNS response without having to query a DNS name server.

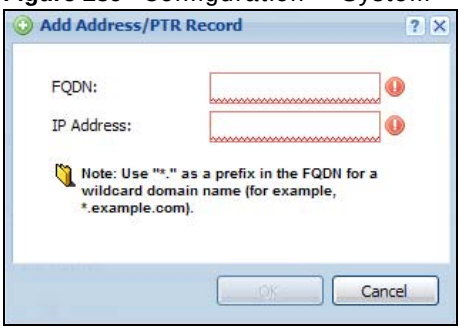
39.6.4 PTR Record

A PTR (pointer) record is also called a reverse record or a reverse lookup record. It is a mapping of an IP address to a domain name.

39.6.5 Adding an Address/PTR Record

Click the **Add** icon in the **Address/PTR Record** table to add an address/PTR record.

Figure 239 Configuration > System > DNS > Address/PTR Record Edit



The following table describes the labels in this screen.

Table 183 Configuration > System > DNS > Address/PTR Record Edit

LABEL	DESCRIPTION
FQDN	Type a Fully-Qualified Domain Name (FQDN) of a server. An FQDN starts with a host name and continues all the way up to the top-level domain name. For example, www.zyxel.com.tw is a fully qualified domain name, where “www” is the host, “zyxel” is the third-level domain, “com” is the second-level domain, and “tw” is the top level domain. Underscores are not allowed. Use "*." as a prefix in the FQDN for a wildcard domain name (for example, *.example.com).
IP Address	Enter the IP address of the host in dotted decimal notation.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving

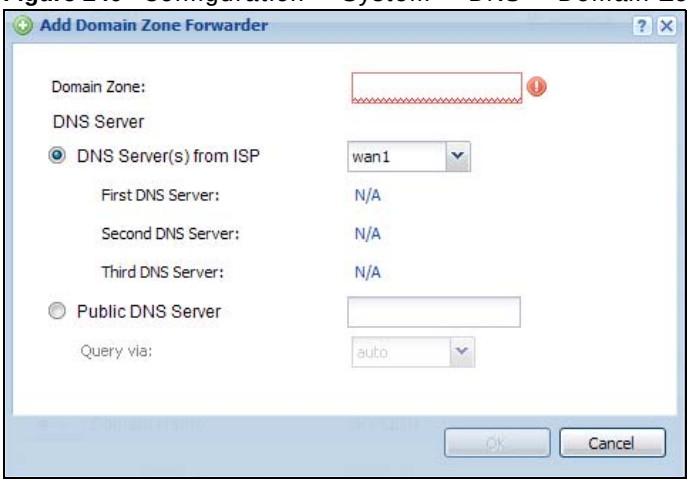
39.6.6 Domain Zone Forwarder

A domain zone forwarder contains a DNS server’s IP address. The UAG can query the DNS server to resolve domain zones for features like DDNS and the time server. A domain zone is a fully qualified domain name without the host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name.

39.6.7 Adding a Domain Zone Forwarder

Click the **Add** icon in the **Domain Zone Forwarder** table to add a domain zone forwarder record.

Figure 240 Configuration > System > DNS > Domain Zone Forwarder Add



The following table describes the labels in this screen.

Table 184 Configuration > System > DNS > Domain Zone Forwarder Add

LABEL	DESCRIPTION
Domain Zone	A domain zone is a fully qualified domain name without the host. For example, zyxel.com.tw is the domain zone for the www.zyxel.com.tw fully qualified domain name. For example, whenever the UAG receives needs to resolve a zyxel.com.tw domain name, it can send a query to the recorded name server IP address. Enter * if all domain zones are served by the specified DNS server(s).
DNS Server	Select **DNS Server(s) from ISP** if your ISP dynamically assigns DNS server information. You also need to select an interface through which the ISP provides the DNS server IP address(es). The interface should be activated and set to be a DHCP client. The fields below display the (read-only) DNS server IP address(es) that the ISP assigns. **N/A** displays for any DNS server IP address fields for which the ISP does not assign an IP address. Select **Public DNS Server** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. The DNS server could be on the Internet or one of the UAG's local networks. You cannot use 0.0.0.0. Use the **Query via** field to select the interface through which the UAG sends DNS queries to a DNS server.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving

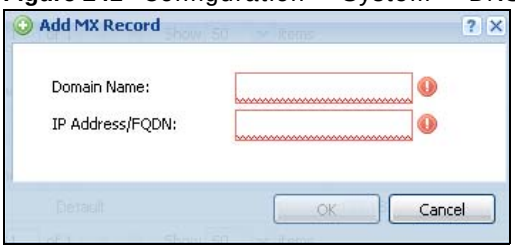
39.6.8 MX Record

A MX (Mail eXchange) record indicates which host is responsible for the mail for a particular domain, that is, controls where mail is sent for that domain. If you do not configure proper MX records for your domain or other domain, external e-mail from other mail servers will not be able to be delivered to your mail server and vice versa. Each host or domain can have only one MX record, that is, one domain is mapping to one host.

39.6.9 Adding a MX Record

Click the **Add** icon in the **MX Record** table to add a MX record.

Figure 241 Configuration > System > DNS > MX Record Add



The following table describes the labels in this screen.

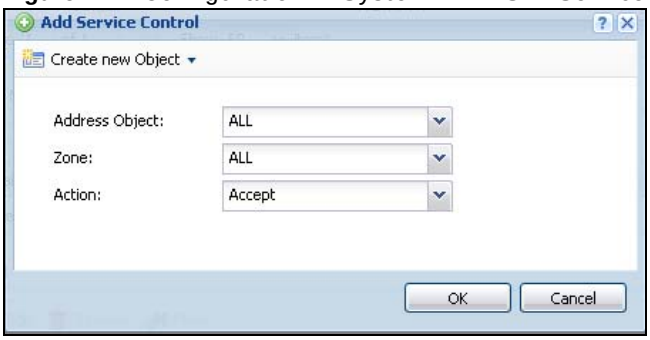
Table 185 Configuration > System > DNS > MX Record Add

LABEL	DESCRIPTION
Domain Name	Enter the domain name where the mail is destined for.
IP Address/FQDN	Enter the IP address or Fully-Qualified Domain Name (FQDN) of a mail server that handles the mail for the domain specified in the field above.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving

39.6.10 Adding a DNS Service Control Rule

Click the **Add** icon in the **Service Control** table to add a service control rule.

Figure 242 Configuration > System > DNS > Service Control Rule Add



The following table describes the labels in this screen.

Table 186 Configuration > System > DNS > Service Control Rule Add

LABEL	DESCRIPTION
Create new Object	Use this to configure any new settings objects that you need to use in this screen.
Address Object	Select **ALL** to allow or deny any computer to send DNS queries to the UAG. Select a predefined address object to just allow or deny the computer with the IP address that you specified to send DNS queries to the UAG.
Zone	Select **ALL** to allow or prevent DNS queries through any zones. Select a predefined zone on which a DNS query to the UAG is allowed or denied.
Action	Select **Accept** to have the UAG allow the DNS queries from the specified computer. Select **Deny** to have the UAG reject the DNS queries from the specified computer.

Table 186 Configuration > System > DNS > Service Control Rule Add (continued)

LABEL	DESCRIPTION
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving

39.7 WWW Overview

The following figure shows secure and insecure management of the UAG coming in from the WAN. HTTPS and SSH access are secure. HTTP and Telnet access are not secure.

Note: To allow the UAG to be accessed from a specified computer using a service, make sure you do not have a service control rule or to-Device firewall rule to block that traffic.

- See To-Device Rules on page 224 for more on To-Device firewall rules.

To stop a service from accessing the UAG, clear **Enable** in the corresponding service screen.

39.7.1 Service Access Limitations

A service cannot be used to access the UAG when:

1. You have disabled that service in the corresponding screen.
2. The allowed IP address (address object) in the **Service Control** table does not match the client IP address (the UAG disallows the session).
3. The IP address (address object) in the **Service Control** table is not in the allowed zone or the action is set to **Deny**.
4. There is a firewall rule that blocks it.

39.7.2 System Timeout

There is a lease timeout for administrators. The UAG automatically logs you out if the management session remains idle for longer than this timeout period. The management session does not time out when a statistics screen is polling.

Each user is also forced to log in the UAG for authentication again when the reauthentication time expires.

You can change the timeout settings in the **User/Group** screens.

39.7.3 HTTPS

You can set the UAG to use HTTP or HTTPS (HTTPS adds security) for Web Configurator sessions. Specify which zones allow Web Configurator access and from which IP address the access can come.

HTTPS (HyperText Transfer Protocol over Secure Socket Layer, or HTTP over SSL) is a web protocol that encrypts and decrypts web pages. Secure Socket Layer (SSL) is an application-level protocol that enables secure transactions of data by ensuring confidentiality (an unauthorized party cannot read the transferred data), authentication (one party can identify the other party) and data integrity (you know if data has been changed).

It relies upon certificates, public keys, and private keys (see Chapter 37 on page 325 for more information).

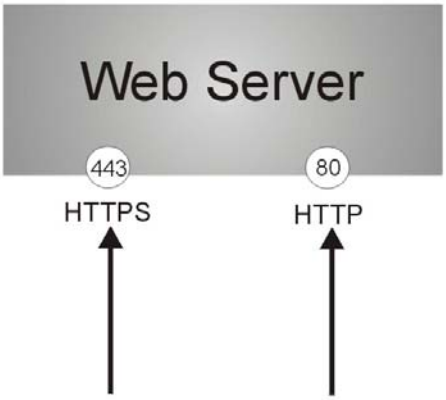
HTTPS on the UAG is used so that you can securely access the UAG using the Web Configurator. The SSL protocol specifies that the HTTPS server (the UAG) must always authenticate itself to the HTTPS client (the computer which requests the HTTPS connection with the UAG), whereas the HTTPS client only should authenticate itself when the HTTPS server requires it to do so (select **Authenticate Client Certificates** in the **WWW** screen). **Authenticate Client Certificates** is optional and if selected means the HTTPS client must send the UAG a certificate. You must apply for a certificate for the browser from a CA that is a trusted CA on the UAG.

Please refer to the following figure.

1 HTTPS connection requests from an SSL-aware web browser go to port 443 (by default) on the UAG's web server.

2 HTTP connection requests from a web browser go to port 80 (by default) on the UAG's web server.

Figure 243 HTTP/HTTPS Implementation



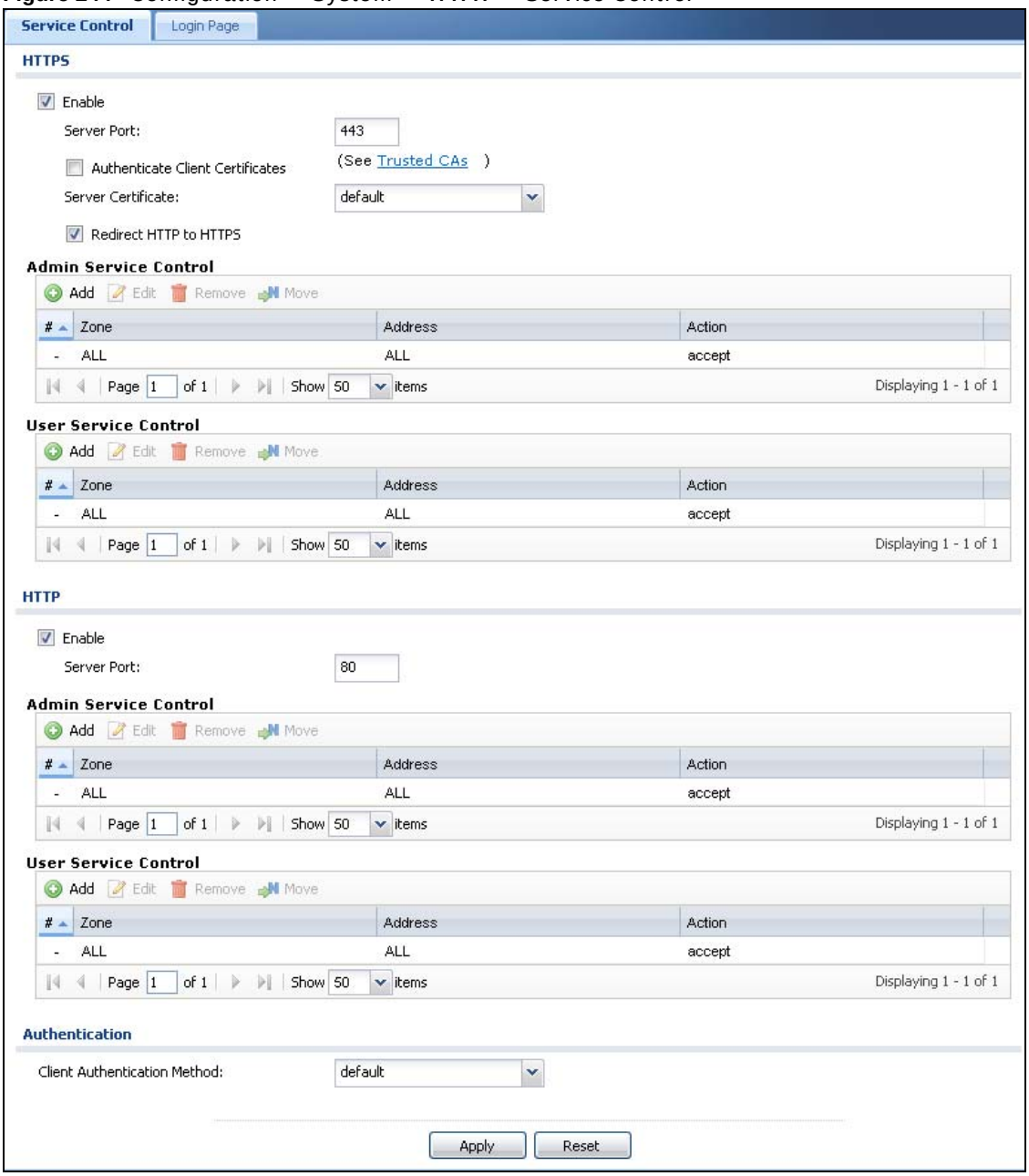
Note: If you disable **HTTP** in the **WWW** screen, then the UAG blocks all HTTP connection attempts.

39.7.4 Configuring WWW Service Control

Click **Configuration > System > WWW** to open the **WWW** screen. Use this screen to specify from which zones you can access the UAG using HTTP or HTTPS. You can also specify which IP addresses the access can come from.

Note: **Admin Service Control** deals with management access (to the Web Configurator). **User Service Control** deals with user access to the UAG (logging into a web portal to access the Internet for example).

Figure 244 Configuration > System > WWW > Service Control



The following table describes the labels in this screen.

Table 187 Configuration > System > WWW > Service Control

LABEL	DESCRIPTION
HTTPS	
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG Web Configurator using secure HTTPs connections.
Server Port	The HTTPS server listens on port 443 by default. If you change the HTTPS server port to a different number on the UAG, for example 8443, then you must notify people who need to access the UAG Web Configurator to use “https://UAG IP Address:**8443**” as the URL.

Table 187 Configuration > System > WWW > Service Control (continued)

LABEL	DESCRIPTION
Authenticate Client Certificates	Select **Authenticate Client Certificates** (optional) to require the SSL client to authenticate itself to the UAG by sending the UAG a certificate. To do that the SSL client must have a CA-signed certificate from a CA that has been imported as a trusted CA on the UAG (see Section 39.7.7.5 on page 368 on importing certificates for details).
Server Certificate	Select a certificate the HTTPS server (the UAG) uses to authenticate itself to the HTTPS client. You must have certificates already configured in the **My Certificates** screen.
Redirect HTTP to HTTPS	To allow only secure Web Configurator access, select this to redirect all HTTP connection requests to the HTTPS server.
Admin/User Service Control	**Admin Service Control** specifies from which zones an administrator can use HTTPS to manage the UAG (using the Web Configurator). You can also specify the IP addresses from which the administrators can manage the UAG. **User Service Control** specifies from which zones a user can use HTTPS to log into the UAG (to log into a web portal to access the Internet for example). You can also specify the IP addresses from which the users can access the UAG.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This is the index number of the service control rule. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
HTTP	
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG Web Configurator using HTTP connections.
Server Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service to access the UAG.
Admin/User Service Control	**Admin Service Control** specifies from which zones an administrator can use HTTP to manage the UAG (using the Web Configurator). You can also specify the IP addresses from which the administrators can manage the UAG. **User Service Control** specifies from which zones a user can use HTTP to log into the UAG (to log into a web portal to access the Internet for example). You can also specify the IP addresses from which the users can access the UAG.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.

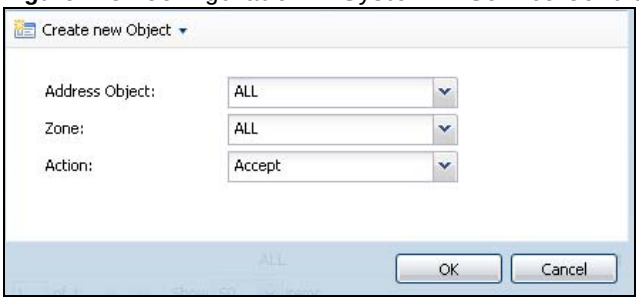
Table 187 Configuration > System > WWW > Service Control (continued)

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This is the index number of the service control rule. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
Authentication	
Client Authentication Method	Select a method the HTTPS or HTTP server uses to authenticate a client. You must have configured the authentication methods in the **Auth. method** screen.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.7.5 Service Control Rules

Click **Add** or **Edit** in the **Service Control** table in a **WWW**, **SSH**, **Telnet**, **FTP** or **SNMP** screen to add a service control rule.

Figure 245 Configuration > System > Service Control Rule > Edit



The following table describes the labels in this screen.

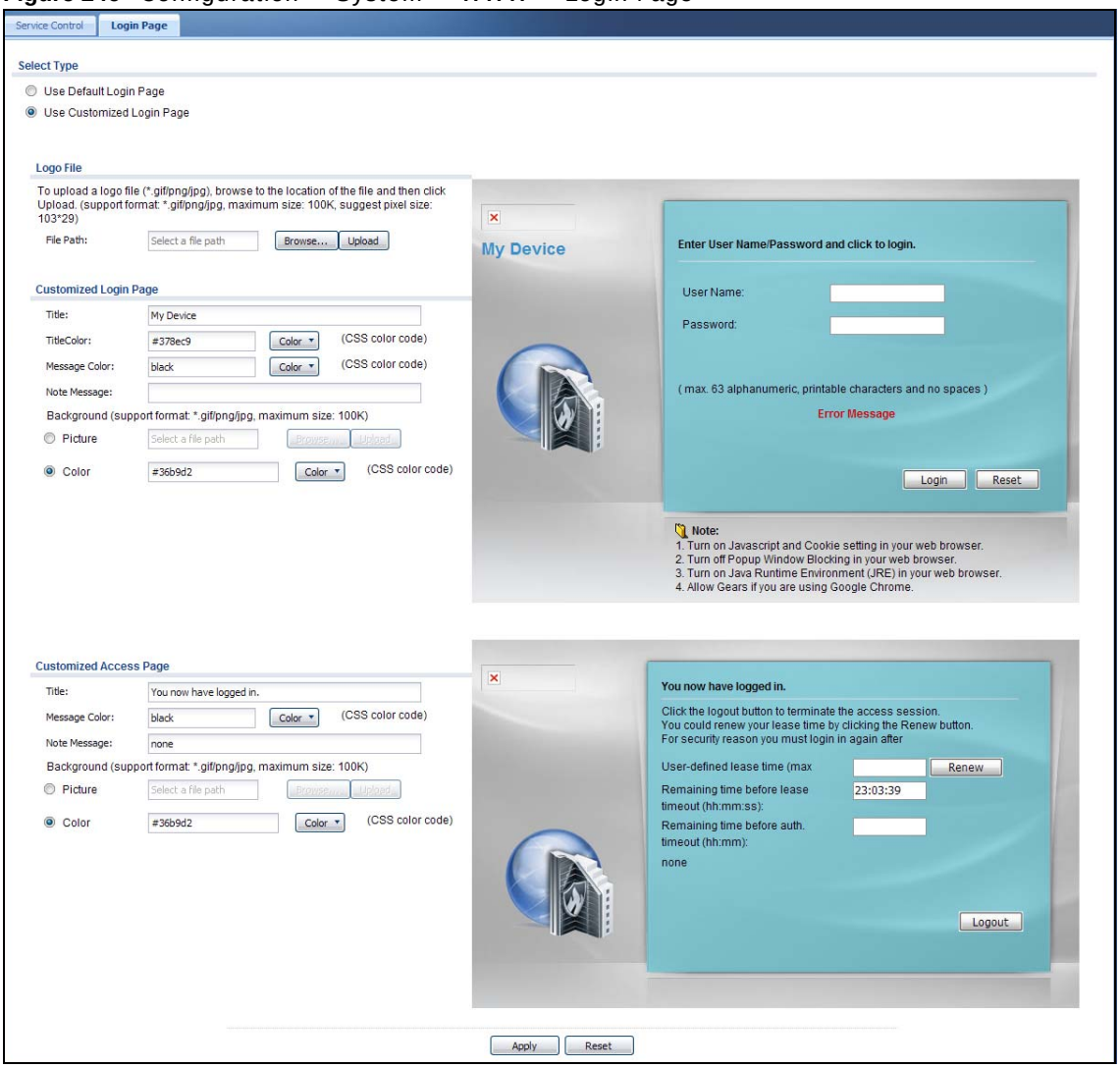
Table 188 Configuration > System > Service Control Rule > Edit

LABEL	DESCRIPTION
Create new Object	Use this to configure any new settings objects that you need to use in this screen.
Address Object	Select **ALL** to allow or deny any computer to communicate with the UAG using this service. Select a predefined address object to just allow or deny the computer with the IP address that you specified to access the UAG using this service.
Zone	Select **ALL** to allow or prevent any UAG zones from being accessed using this service. Select a predefined UAG zone on which a incoming service is allowed or denied.
Action	Select **Accept** to allow the user to access the UAG from the specified computers. Select **Deny** to block the user's access to the UAG from the specified computers.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving

39.7.6 Customizing the WWW Login Page

Click **Configuration > System > WWW > Login Page** to open the **Login Page** screen. Use this screen to customize the Web Configurator login screen. You can also customize the page that displays after an access user logs into the Web Configurator to access network services like the Internet. See Chapter 30 on page 275 for more on access user accounts.

Figure 246 Configuration > System > WWW > Login Page



The following figures identify the parts you can customize in the login and access pages.

Figure 247 Login Page Customization

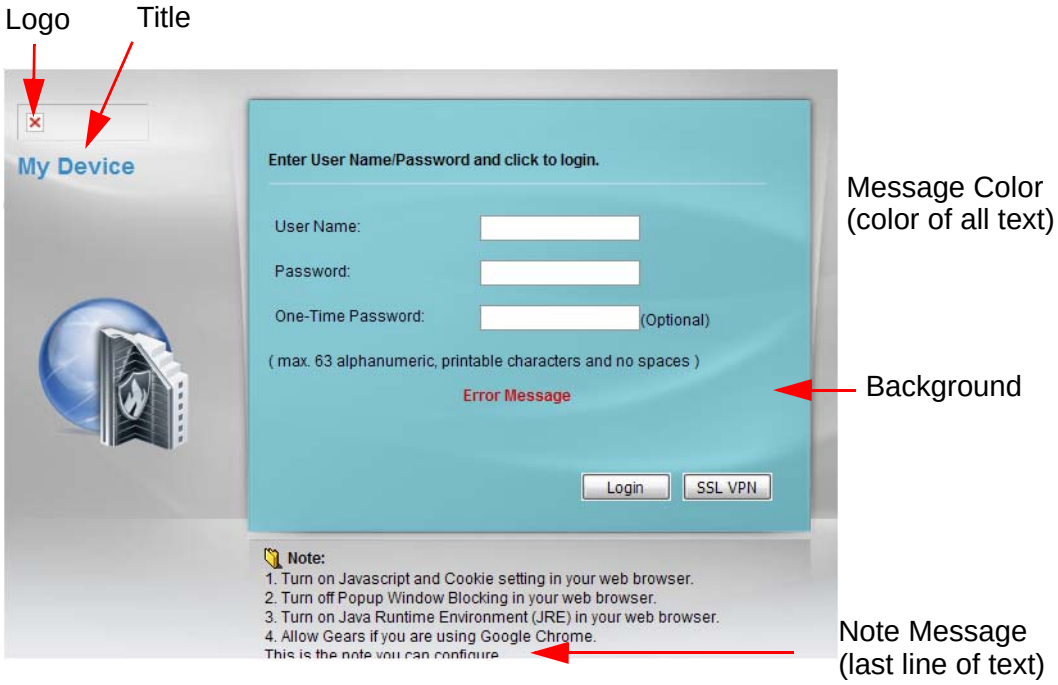
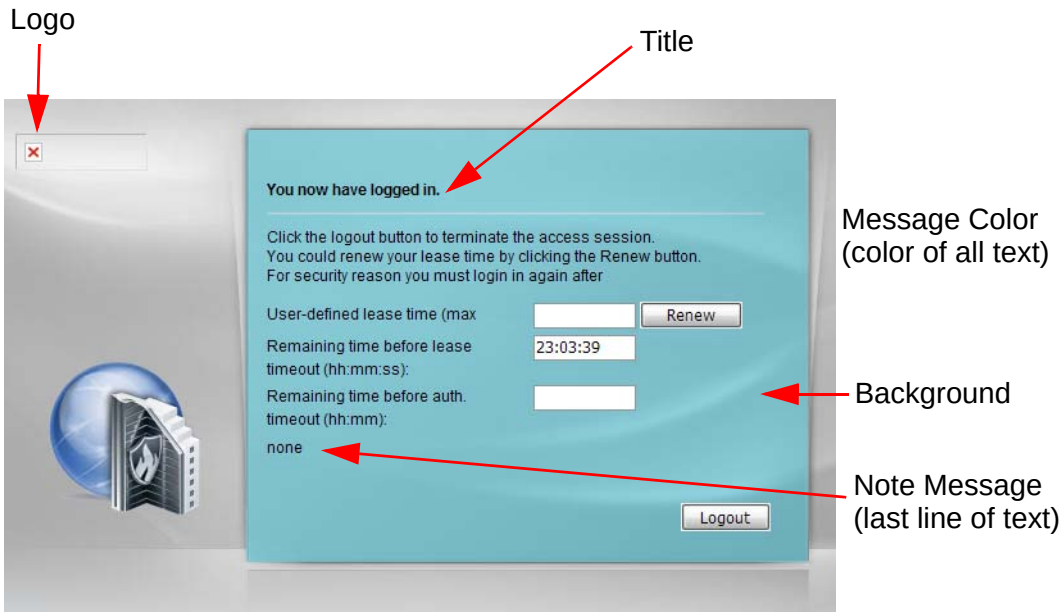


Figure 248 Access Page Customization



You can specify colors in one of the following ways:

- Click **Color** to display a screen of web-safe colors from which to choose.
- Enter the name of the desired color.
- Enter a pound sign (#) followed by the six-digit hexadecimal number that represents the desired color. For example, use "#000000" for black.

- Enter “rgb” followed by red, green, and blue values in parenthesis and separate by commas. For example, use “rgb(0,0,0)” for black.

Your desired color should display in the preview screen on the right after you click in another field, click **Apply**, or press [ENTER]. If your desired color does not display, your browser may not support it. Try selecting another color.

The following table describes the labels in the screen.

Table 189 Configuration > System > WWW > Login Page

LABEL	DESCRIPTION
Select Type	Select whether the Web Configurator uses the default login screen or one that you customize in the rest of this screen.
Logo File	You can upload a graphic logo to be displayed on the upper left corner of the Web Configurator login screen and access page. Specify the location and file name of the logo graphic or click **Browse** to locate it. Note: Use a GIF, JPG, or PNG of 100 kilobytes or less. Click **Upload** to transfer the specified graphic file from your computer to the UAG.
Customized Login Page	Use this section to set how the Web Configurator login screen looks.
Title	Enter the title for the top of the screen. Use up to 64 printable ASCII characters. Spaces are allowed.
Title Color	Specify the color of the screen’s title text.
Message Color	Specify the color of the screen’s text.
Note Message	Enter a note to display at the bottom of the screen. Use up to 64 printable ASCII characters. Spaces are allowed.
Background	Set how the screen background looks. To use a graphic, select **Picture** and upload a graphic. Specify the location and file name of the logo graphic or click **Browse** to locate it. The picture’s size cannot be over 438 x 337 pixels. Note: Use a GIF, JPG, or PNG of 100 kilobytes or less. To use a color, select **Color** and specify the color.
Customized Access Page	Use this section to customize the page that displays after an access user logs into the Web Configurator to access network services like the Internet.
Title	Enter the title for the top of the screen. Use up to 64 printable ASCII characters. Spaces are allowed.
Message Color	Specify the color of the screen’s text.
Note Message	Enter a note to display below the title. Use up to 64 printable ASCII characters. Spaces are allowed.
Background	Set how the window’s background looks. To use a graphic, select **Picture** and upload a graphic. Specify the location and file name of the logo graphic or click **Browse** to locate it. The picture’s size cannot be over 438 x 337 pixels. Note: Use a GIF, JPG, or PNG of 100 kilobytes or less. To use a color, select **Color** and specify the color.

Table 189 Configuration > System > WWW > Login Page

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

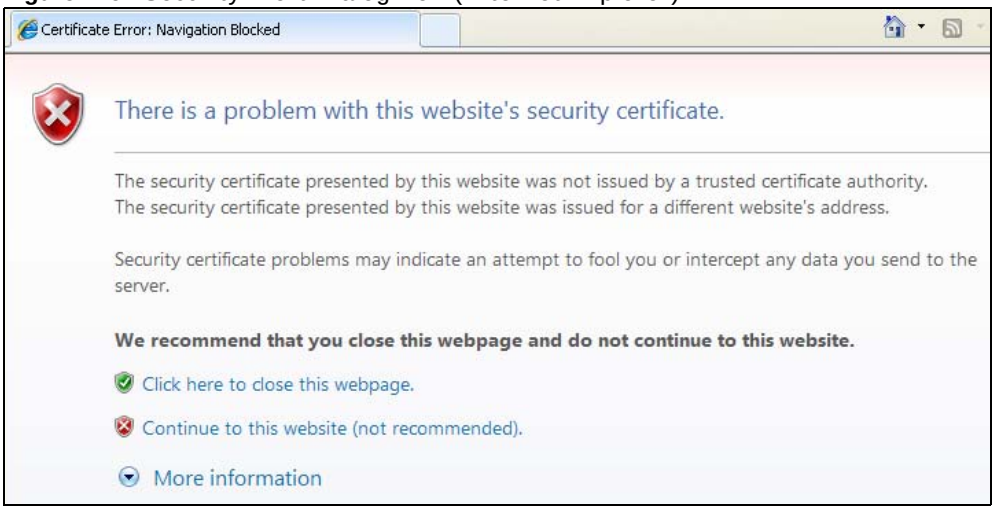
39.7.7 HTTPS Example

If you haven't changed the default HTTPS port on the UAG, then in your browser enter "https://UAG IP Address/" as the web site address where "UAG IP Address" is the IP address or domain name of the UAG you wish to access.

39.7.7.1 Internet Explorer Warning Messages

When you attempt to access the UAG HTTPS server, you will see the error message shown in the following screen.

Figure 249 Security Alert Dialog Box (Internet Explorer)



Select **Continue to this website** to proceed to the Web Configurator login screen. Otherwise, select **Click here to close this webpage** to block the access.

39.7.7.2 Mozilla Firefox Warning Messages

When you attempt to access the UAG HTTPS server, a **The Connection is Untrusted** screen appears as shown in the following screen. Click **Technical Details** if you want to verify more information about the certificate from the UAG.

Select **I Understand the Risks** and then click **Add Exception** to add the UAG to the security exception list. Click **Confirm Security Exception**.

Figure 250 Security Certificate 1 (Firefox)

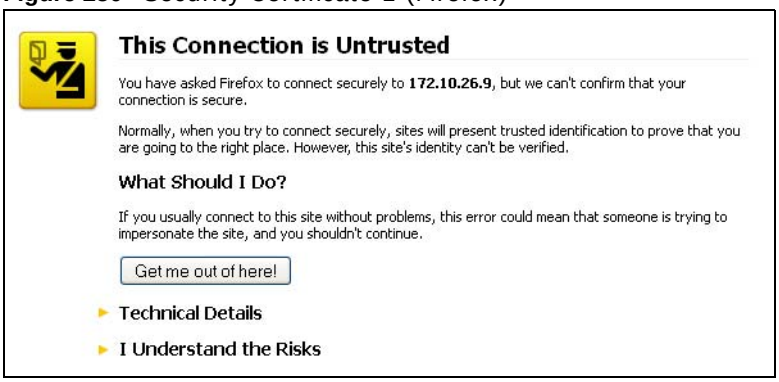
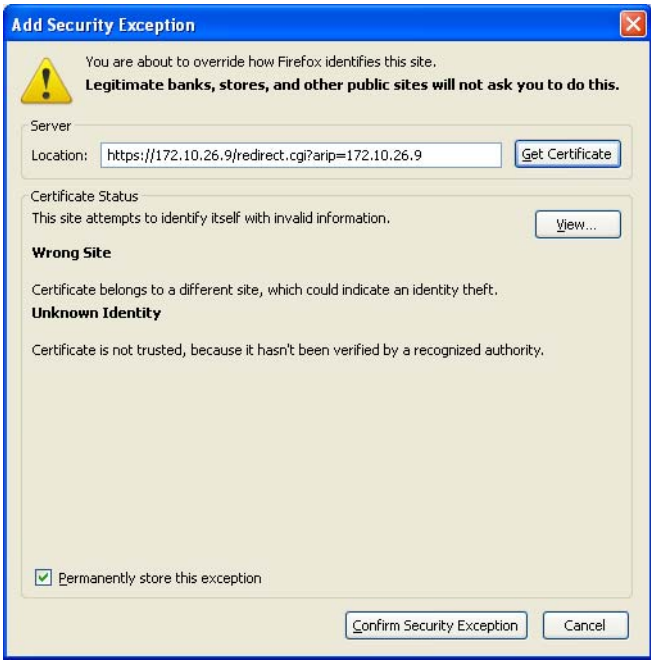


Figure 251 Security Certificate 2 (Firefox)



39.7.7.3 Avoiding Browser Warning Messages

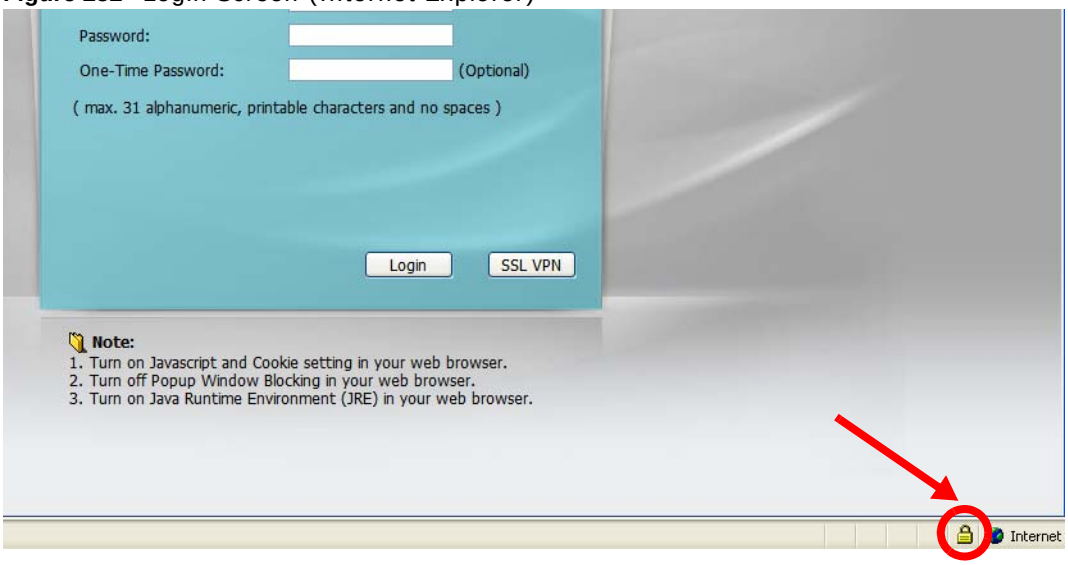
Here are the main reasons your browser displays warnings about the UAG's HTTPS server certificate and what you can do to avoid seeing the warnings:

- The issuing certificate authority of the UAG's HTTPS server certificate is not one of the browser's trusted certificate authorities. The issuing certificate authority of the UAG's factory default certificate is the UAG itself since the certificate is a self-signed certificate.
- For the browser to trust a self-signed certificate, import the self-signed certificate into your operating system as a trusted certificate.
- To have the browser trust the certificates issued by a certificate authority, import the certificate authority's certificate into your operating system as a trusted certificate.

39.7.7.4 Login Screen

After you accept the certificate, the UAG login screen appears. The lock displayed in the bottom of the browser status bar denotes a secure connection.

Figure 252 Login Screen (Internet Explorer)



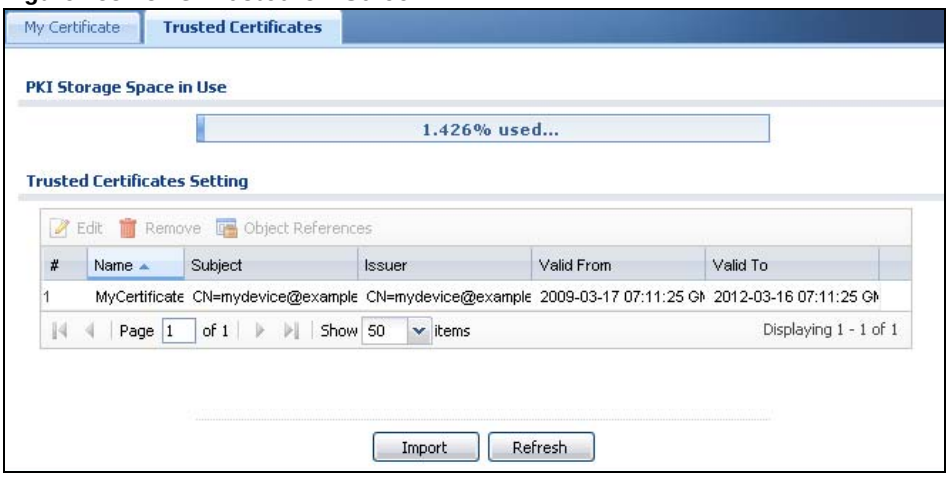
39.7.7.5 Enrolling and Importing SSL Client Certificates

The SSL client needs a certificate if **Authenticate Client Certificates** is selected on the UAG.

You must have imported at least one trusted CA to the UAG in order for the **Authenticate Client Certificates** to be active (see the Certificates chapter for details).

Apply for a certificate from a Certification Authority (CA) that is trusted by the UAG (see the UAG's **Trusted CA** Web Configurator screen).

Figure 253 UAG Trusted CA Screen



The CA sends you a package containing the CA's trusted certificate(s), your personal certificate(s) and a password to install the personal certificate(s).

39.7.7.5.1 Installing the CA's Certificate

1 Double click the CA's trusted certificate to produce a screen similar to the one shown next.

Figure 254 CA Certificate Example

2 Click **Install Certificate** and follow the wizard as shown earlier in this appendix.

39.7.7.5.2 Installing Your Personal Certificate(s)

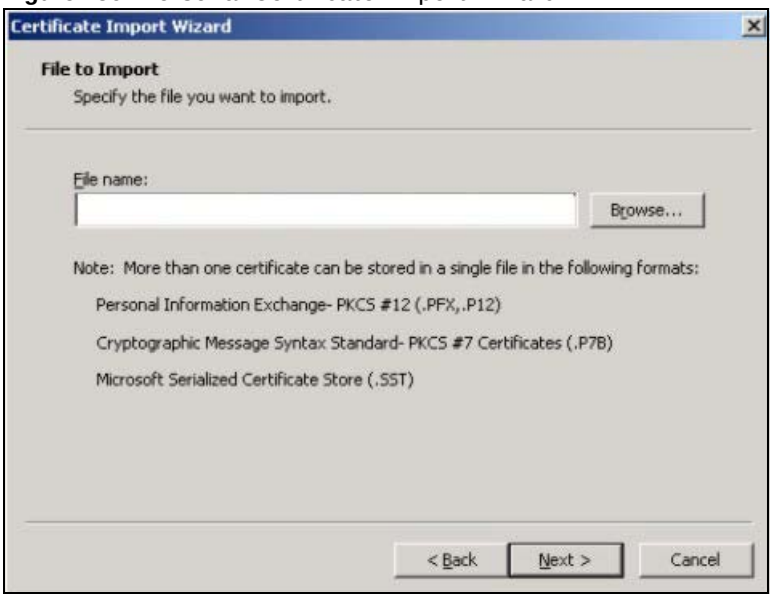
You need a password in advance. The CA may issue the password or you may have to specify it during the enrollment. Double-click the personal certificate given to you by the CA to produce a screen similar to the one shown next

1 Click **Next** to begin the wizard.

Figure 255 Personal Certificate Import Wizard 1

2 The file name and path of the certificate you double-clicked should automatically appear in the **File name** text box. Click **Browse** if you wish to import a different certificate.

Figure 256 Personal Certificate Import Wizard 2

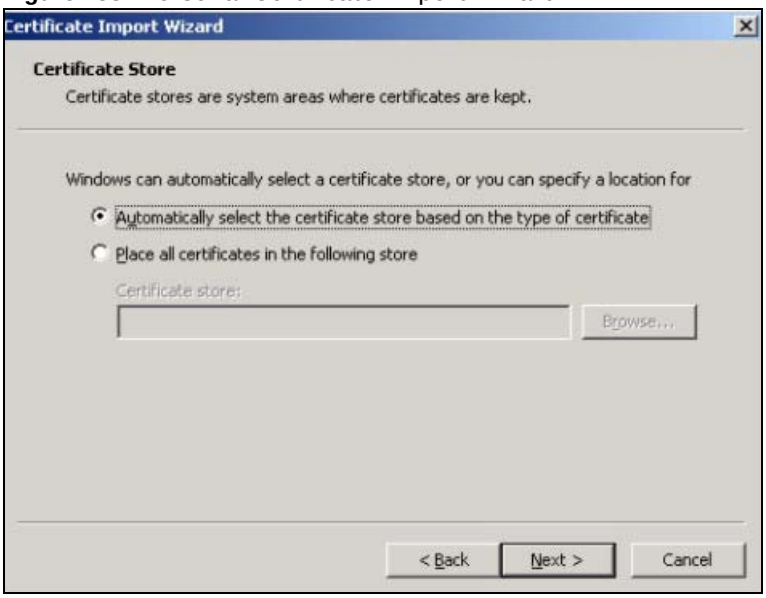


3 Enter the password given to you by the CA.

Figure 257 Personal Certificate Import Wizard 3

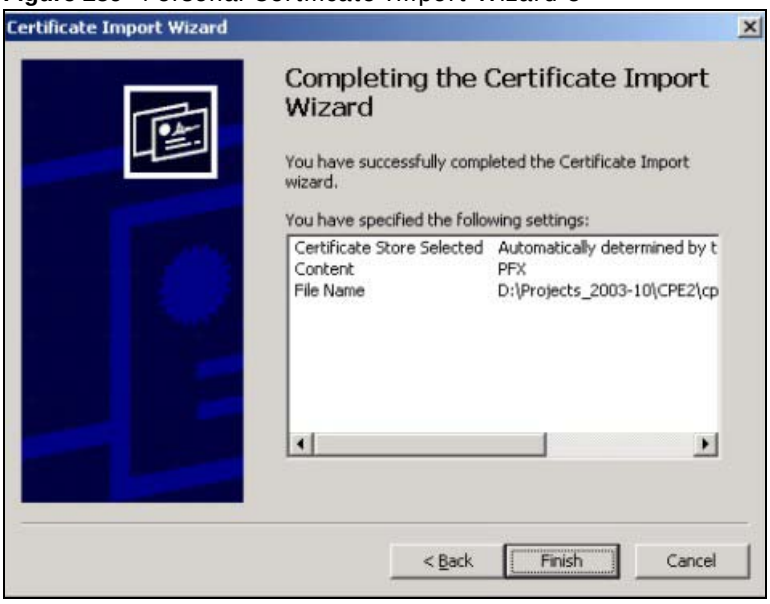
4 Have the wizard determine where the certificate should be saved on your computer or select **Place all certificates in the following store** and choose a different location.

Figure 258 Personal Certificate Import Wizard 4



5 Click **Finish** to complete the wizard and begin the import process.

Figure 259 Personal Certificate Import Wizard 5



6 You should see the following screen when the certificate is correctly installed on your computer.

Figure 260 Personal Certificate Import Wizard 6

39.7.7.6 Using a Certificate When Accessing the UAG Example

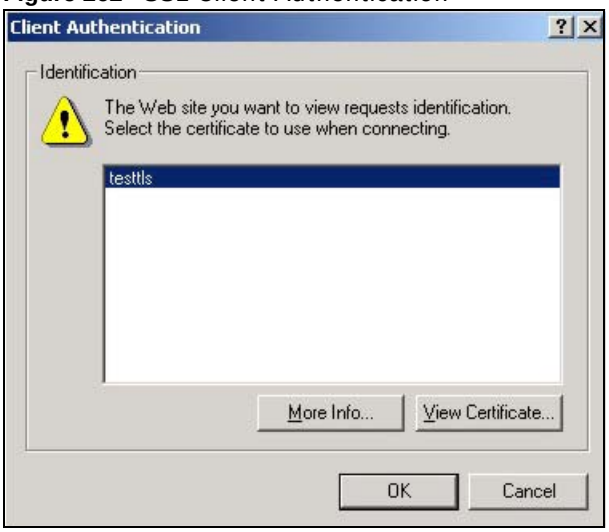
Use the following procedure to access the UAG via HTTPS.

1 Enter 'https://UAG IP Address/ in your browser's web address field.

Figure 261 Access the UAG Via HTTPS

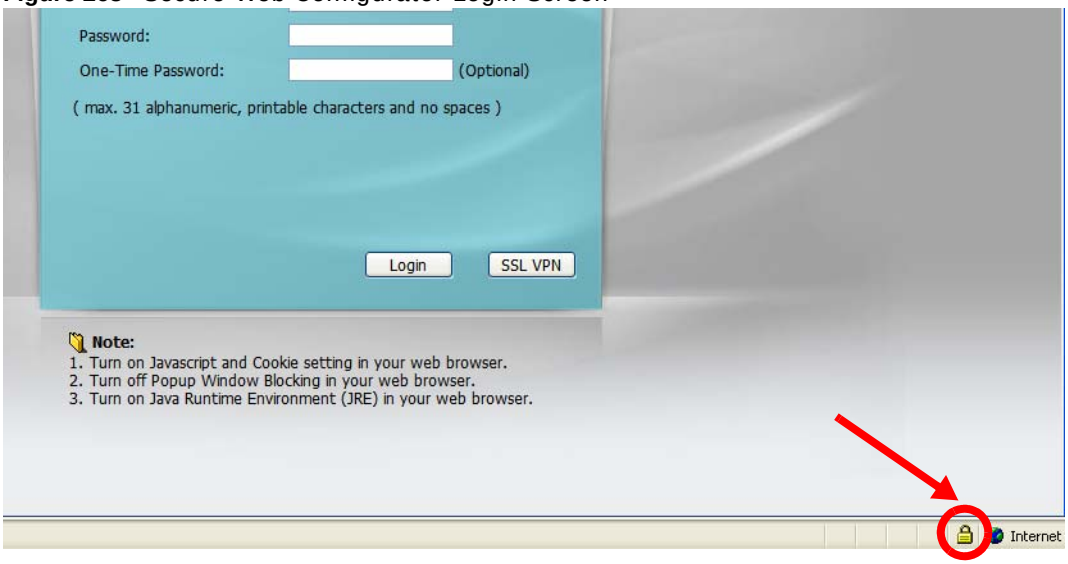
2 When **Authenticate Client Certificates** is selected on the UAG, the following screen asks you to select a personal certificate to send to the UAG. This screen displays even if you only have a single certificate as in the example.

Figure 262 SSL Client Authentication



3 You next see the Web Configurator login screen.

Figure 263 Secure Web Configurator Login Screen



39.8 SSH

You can use SSH (Secure SHell) to securely access the UAG's command line interface. Specify which zones allow SSH access and from which IP address the access can come.

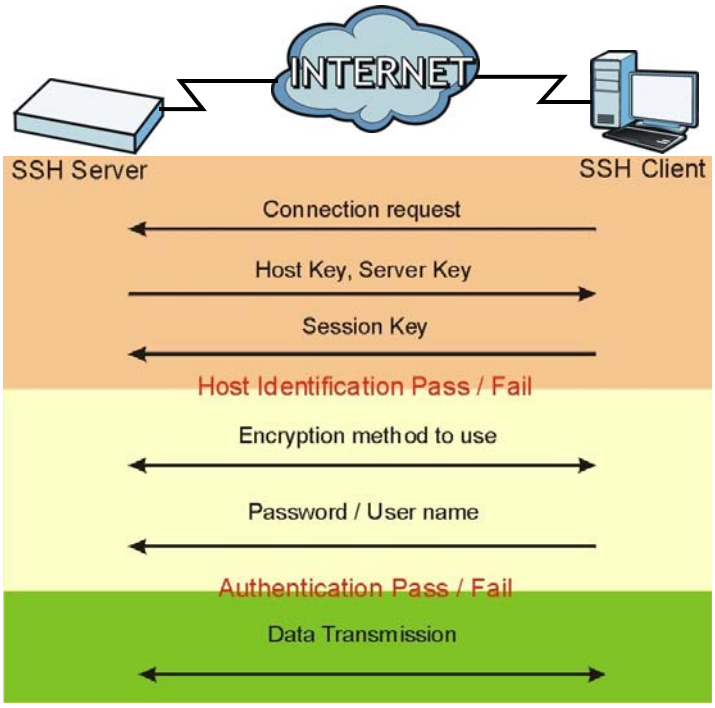
SSH is a secure communication protocol that combines authentication and data encryption to provide secure encrypted communication between two hosts over an unsecured network. In the following figure, computer A on the Internet uses SSH to securely connect to the WAN port of the UAG for a management session.

Figure 264 SSH Communication Over the WAN Example

39.8.1 How SSH Works

The following figure is an example of how a secure connection is established between two remote hosts using SSH v1.

Figure 265 How SSH v1 Works Example



1 Host Identification

The SSH client sends a connection request to the SSH server. The server identifies itself with a host key. The client encrypts a randomly generated session key with the host key and server key and sends the result back to the server.

The client automatically saves any new server public keys. In subsequent connections, the server public key is checked against the saved version on the client computer.

2 Encryption Method

Once the identification is verified, both the client and server must agree on the type of encryption method to use.

3 Authentication and Data Transmission

After the identification is verified and data encryption activated, a secure tunnel is established between the client and the server. The client then sends its authentication information (user name and password) to the server to log in to the server.

39.8.2 SSH Implementation on the UAG

Your UAG supports SSH versions 1 and 2 using RSA authentication and four encryption methods (AES, 3DES, Archfour, and Blowfish). The SSH server is implemented on the UAG for management using port 22 (by default).

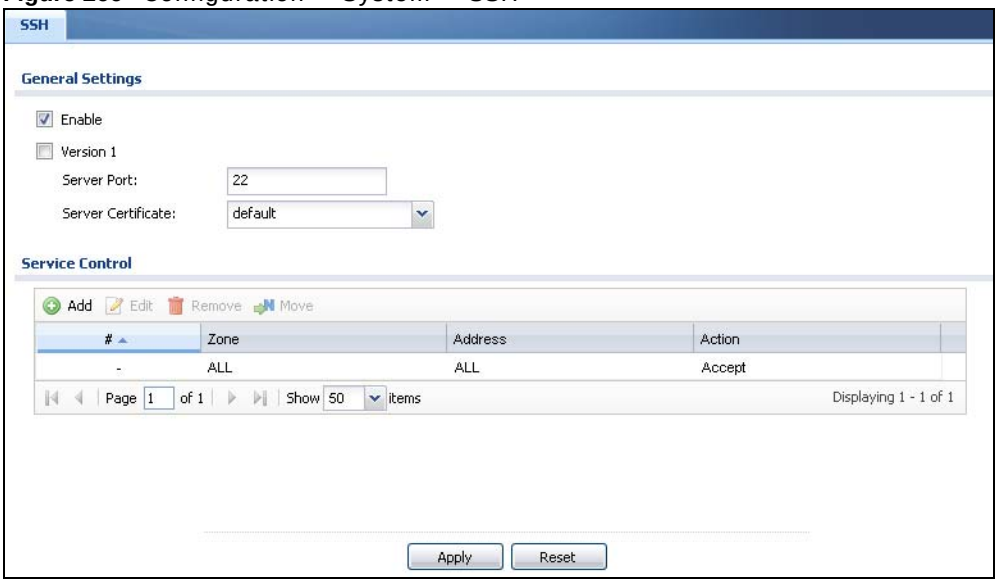
39.8.3 Requirements for Using SSH

You must install an SSH client program on a client computer (Windows or Linux operating system) that is used to connect to the UAG over SSH.

39.8.4 Configuring SSH

Click **Configuration > System > SSH** to change your UAG's Secure Shell settings. Use this screen to specify from which zones SSH can be used to manage the UAG. You can also specify from which IP addresses the access can come.

Figure 266 Configuration > System > SSH



The following table describes the labels in this screen.

Table 190 Configuration > System > SSH

LABEL	DESCRIPTION
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG CLI using this service.
Version 1	Select the check box to have the UAG use both SSH version 1 and version 2 protocols. If you clear the check box, the UAG uses only SSH version 2 protocol.

Table 190 Configuration > System > SSH (continued)

LABEL	DESCRIPTION
Server Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service for remote management.
Server Certificate	Select the certificate whose corresponding private key is to be used to identify the UAG for SSH connections. You must have certificates already configured in the **My Certificates** screen (See Chapter 37 on page 325 for details).
Service Control	This specifies from which computers you can access which UAG zones.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry. Refer to Table 188 on page 362 for details on the screen that opens.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This the index number of the service control rule.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.8.5 Secure Telnet Using SSH Examples

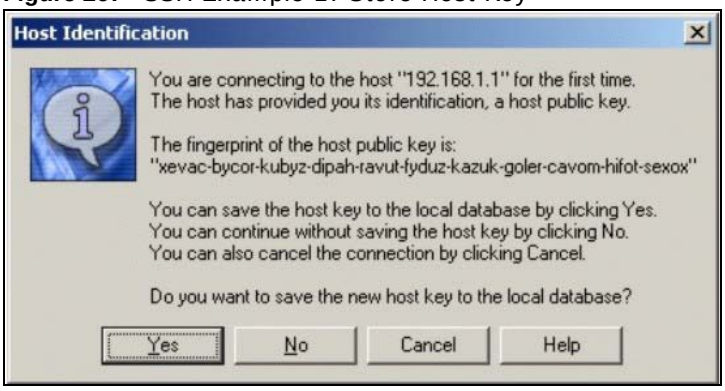
This section shows two examples using a command interface and a graphical interface SSH client program to remotely access the UAG. The configuration and connection steps are similar for most SSH client programs. Refer to your SSH client program user's guide.

39.8.5.1 Example 1: Microsoft Windows

This section describes how to access the UAG using the Secure Shell Client program.

1. Launch the SSH client and specify the connection information (IP address, port number) for the UAG.
2. Configure the SSH client to accept connection using SSH version 1.
3. A window displays prompting you to store the host key in you computer. Click **Yes** to continue.

Figure 267 SSH Example 1: Store Host Key



Enter the password to log in to the UAG. The CLI screen displays next.

39.8.5.2 Example 2: Linux

This section describes how to access the UAG using the OpenSSH client program that comes with most Linux distributions.

1 Test whether the SSH service is available on the UAG.

Enter "`telnet 172.16.0.1 22`" at a terminal prompt and press [ENTER]. The computer attempts to connect to port 22 on the UAG (using the default IP address of 172.16.0.1).

A message displays indicating the SSH protocol version supported by the UAG.

Figure 268 SSH Example 2: Test

```
$ telnet 172.16.0.1 22
Trying 172.16.0.1...
Connected to 172.16.0.1.
Escape character is '^]'.
SSH-1.5-1.0.0
```

2 Enter "`ssh –1 172.16.0.1`". This command forces your computer to connect to the UAG using SSH version 1. If this is the first time you are connecting to the UAG using SSH, a message displays prompting you to save the host information of the UAG. Type "yes" and press [ENTER].

Then enter the password to log in to the UAG.

Figure 269 SSH Example 2: Log in

```
$ ssh –1 172.16.0.1
The authenticity of host '172.16.0.1 (172.16.0.1)' can't be established.
RSA1 key fingerprint is 21:6c:07:25:7e:f4:75:80:ec:af:bd:d4:3d:80:53:d1.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '172.16.0.1' (RSA1) to the list of known hosts.
Administrator@172.16.0.1's password:
```

3 The CLI screen displays next.

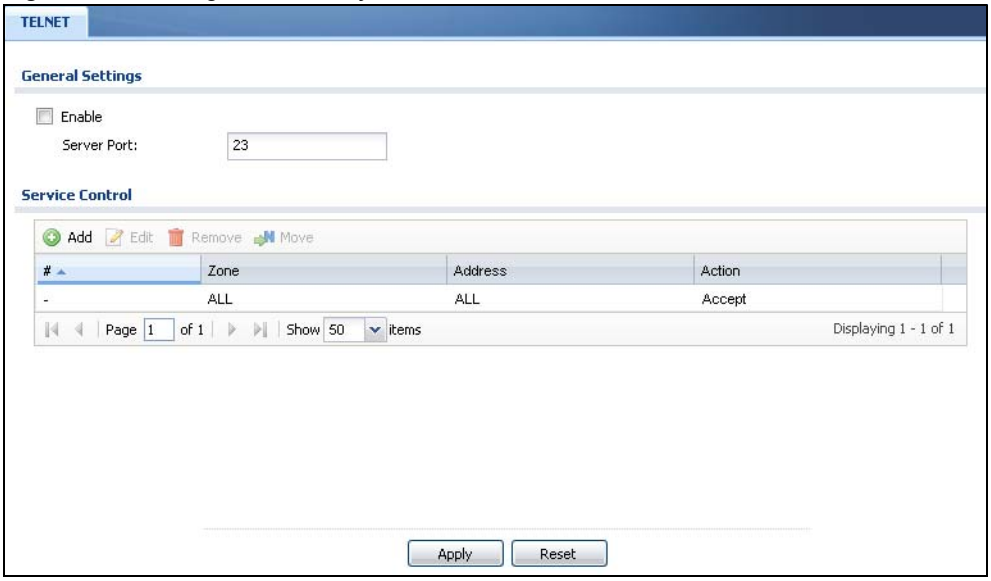
39.9 Telnet

You can use Telnet to access the UAG's command line interface. Specify which zones allow Telnet access and from which IP address the access can come.

39.9.1 Configuring Telnet

Click **Configuration > System > TELNET** to configure your UAG for remote Telnet access. Use this screen to specify from which zones Telnet can be used to manage the UAG. You can also specify from which IP addresses the access can come.

Figure 270 Configuration > System > TELNET



The following table describes the labels in this screen.

Table 191 Configuration > System > TELNET

LABEL	DESCRIPTION
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG CLI using this service.
Server Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service for remote management.
Service Control	This specifies from which computers you can access which UAG zones.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry. Refer to Table 188 on page 362 for details on the screen that opens.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.

Table 191 Configuration > System > TELNET (continued)

LABEL	DESCRIPTION
#	This the index number of the service control rule. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

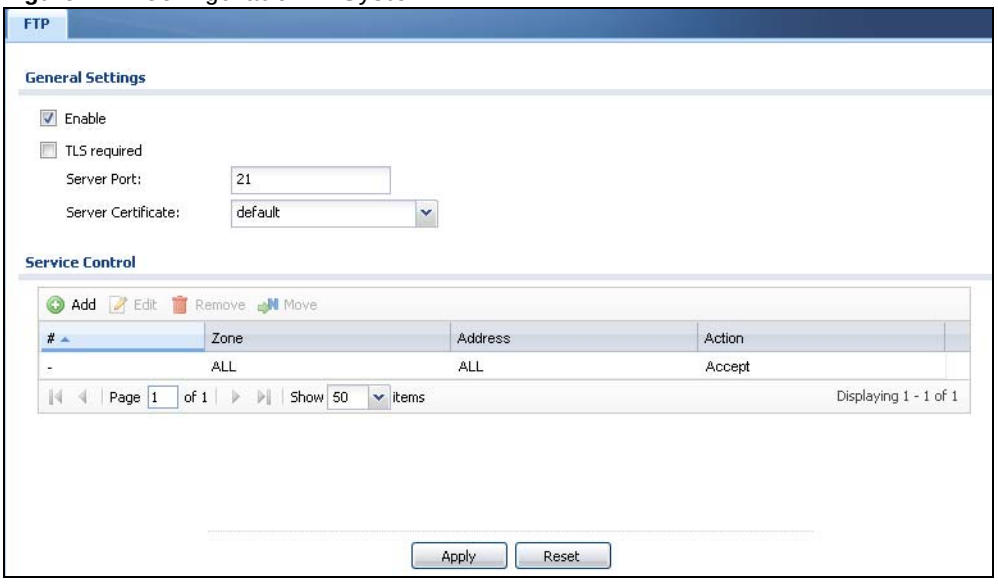
39.10 FTP

You can upload and download the UAG's firmware and configuration files using FTP. To use this feature, your computer must have an FTP client. Please see Chapter 41 on page 400 for more information about firmware and configuration files.

39.10.1 Configuring FTP

To change your UAG's FTP settings, click **Configuration > System > FTP** tab. The screen appears as shown. Use this screen to specify from which zones FTP can be used to access the UAG. You can also specify from which IP addresses the access can come.

Figure 271 Configuration > System > FTP



The following table describes the labels in this screen.

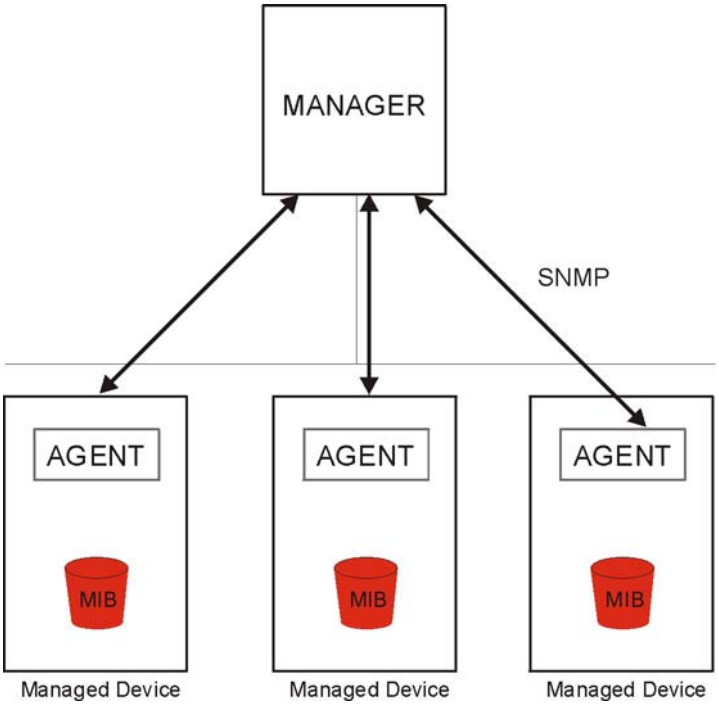
Table 192 Configuration > System > FTP

LABEL	DESCRIPTION
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG using this service.
TLS required	Select the check box to use FTP over TLS (Transport Layer Security) to encrypt communication. This implements TLS as a security mechanism to secure FTP clients and/or servers.
Server Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service for remote management.
Server Certificate	Select the certificate whose corresponding private key is to be used to identify the UAG for FTP connections. You must have certificates already configured in the **My Certificates** screen (See Chapter 37 on page 325 for details).
Service Control	This specifies from which computers you can access which UAG zones.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry. Refer to Table 188 on page 362 for details on the screen that opens.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This the index number of the service control rule. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.11 SNMP

Simple Network Management Protocol is a protocol used for exchanging management information between network devices. Your UAG supports SNMP agent functionality, which allows a manager station to manage and monitor the UAG through the network. The UAG supports SNMP version one (SNMPv1) and version two (SNMPv2c). The next figure illustrates an SNMP management operation.

Figure 272 SNMP Management Model



An SNMP managed network consists of two main types of component: agents and a manager.

An agent is a management software module that resides in a managed device (the UAG). An agent translates the local management information from the managed device into a form compatible with SNMP. The manager is the console through which network administrators perform network management functions. It executes applications that control and monitor managed devices.

The managed devices contain object variables/managed objects that define each piece of information to be collected about a device. Examples of variables include such as number of packets received, node port status etc. A Management Information Base (MIB) is a collection of managed objects. SNMP allows a manager and agents to communicate for the purpose of accessing these objects.

SNMP itself is a simple request/response protocol based on the manager/agent model. The manager issues a request and the agent returns responses using the following protocol operations:

- Get - Allows the manager to retrieve an object variable from the agent.
- GetNext - Allows the manager to retrieve the next object variable from a table or list within an agent. In SNMPv1, when a manager wants to retrieve all elements of a table from an agent, it initiates a Get operation, followed by a series of GetNext operations.
- Set - Allows the manager to set values for object variables within an agent.
- Trap - Used by the agent to inform the manager of some events.

39.11.1 Supported MIBs

The UAG supports MIB II that is defined in RFC-1213 and RFC-1215. The UAG also supports private MIBs (private.mib and enterprise.mib) to collect information about CPU and memory usage. The focus of the MIBs is to let administrators collect statistical data and monitor status and performance. You can download the UAG's MIBs from www.zyxel.com.

39.11.2 SNMP Traps

The UAG will send traps to the SNMP manager when any one of the following events occurs.

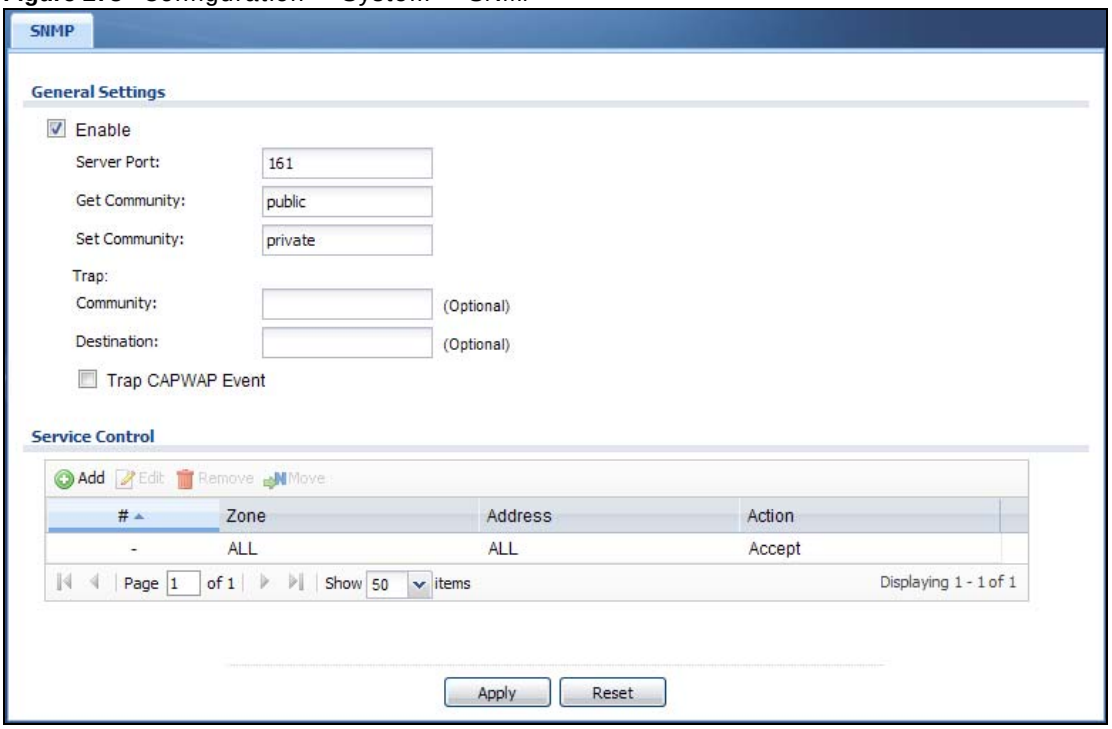
Table 193 SNMP Traps

OBJECT LABEL	OBJECT ID	DESCRIPTION
Cold Start	1.3.6.1.6.3.1.1.5.1	This trap is sent when the UAG is turned on or an agent restarts.
linkDown	1.3.6.1.6.3.1.1.5.3	This trap is sent when the Ethernet link is down.
linkUp	1.3.6.1.6.3.1.1.5.4	This trap is sent when the Ethernet link is up.
authenticationFailure	1.3.6.1.6.3.1.1.5.5	This trap is sent when an SNMP request comes from non-authenticated hosts.

39.11.3 Configuring SNMP

To change your UAG's SNMP settings, click **Configuration > System > SNMP** tab. The screen appears as shown. Use this screen to configure your SNMP settings, including from which zones SNMP can be used to access the UAG. You can also specify from which IP addresses the access can come.

Figure 273 Configuration > System > SNMP



The following table describes the labels in this screen.

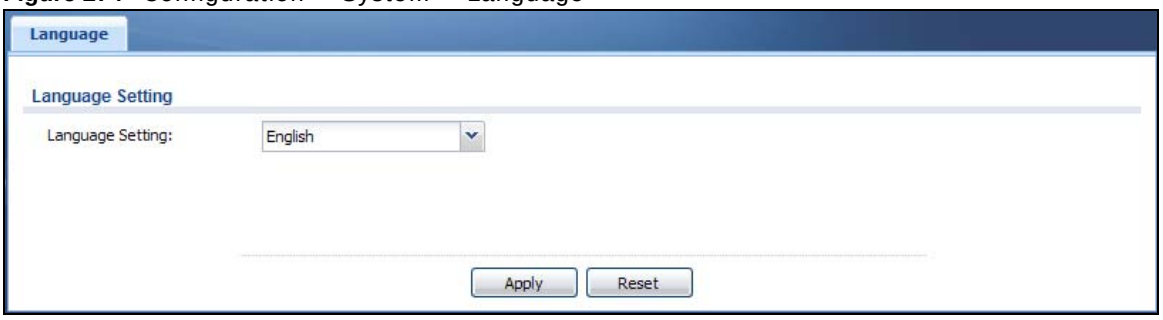
Table 194 Configuration > System > SNMP

LABEL	DESCRIPTION
Enable	Select the check box to allow or disallow the computer with the IP address that matches the IP address(es) in the **Service Control** table to access the UAG using this service.
Server Port	You may change the server port number for a service if needed, however you must use the same port number in order to use that service for remote management.
Get Community	Enter the **Get Community**, which is the password for the incoming Get and GetNext requests from the management station. The default is public and allows all requests.
Set Community	Enter the **Set community**, which is the password for incoming Set requests from the management station. The default is private and allows all requests.
Trap	
Community	Type the trap community, which is the password sent with each trap to the SNMP manager. The default is public and allows all requests.
Destination	Type the IP address of the SNMP manager to which your SNMP traps are sent.
Trap CAPWAP Event	Select this option to have the UAG send a trap to the SNMP manager when a managed AP is connected to or disconnected from the UAG.
Service Control	This specifies from which computers you can access which UAG zones.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry. Refer to Table 188 on page 362 for details on the screen that opens.
Edit	Double-click an entry or select it and click **Edit** to be able to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The UAG confirms you want to remove it before doing so. Note that subsequent entries move up by one when you take this action.
Move	To change an entry's position in the numbered list, select the method and click **Move** to display a field to type a number for where you want to put it and press [ENTER] to move the rule to the number that you typed.
#	This the index number of the service control rule. The entry with a hyphen (-) instead of a number is the UAG's (non-configurable) default policy. The UAG applies this to traffic that does not match any other configured rule. It is not an editable rule. To apply other behavior, configure a rule that traffic will match so the UAG will not have to use the default policy.
Zone	This is the zone on the UAG the user is allowed or denied to access.
Address	This is the object name of the IP address(es) with which the computer is allowed or denied to access.
Action	This displays whether the computer with the IP address specified above can access the UAG zone(s) configured in the **Zone** field (**Accept**) or not (**Deny**).
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

39.12 Language

Click **Configuration > System > Language** to open this screen. Use this screen to select a display language for the UAG's Web Configurator screens.

Figure 274 Configuration > System > Language



The following table describes the labels in this screen.

Table 195 Configuration > System > Language

LABEL	DESCRIPTION
Language Setting	Select a display language for the UAG's Web Configurator screens. You also need to open a new browser session to display the screens in the new language.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

40

Log and Report

40.1 Overview

Use these screens to configure daily reporting and log settings.

40.1.1 What You Can Do In this Chapter

- Use the **Email Daily Report** screen (Section 40.2 on page 385) to configure where and how to send daily reports and what reports to send.
- Use the **Log Settings** screens (Section 40.3 on page 387) to specify settings for recording log messages and alerts, e-mailing them, storing them on a connected USB storage device, and sending them to remote syslog servers.

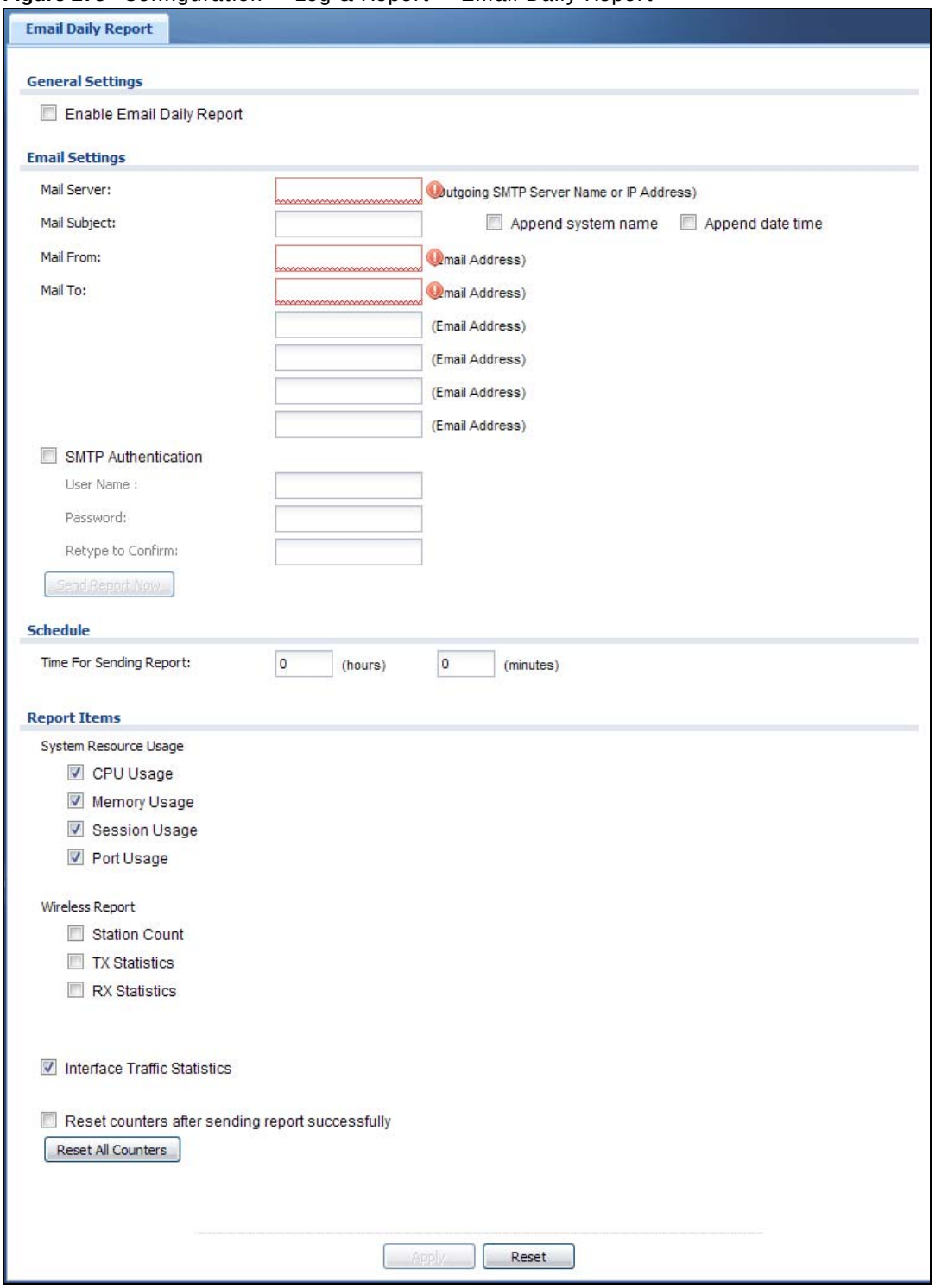
40.2 Email Daily Report

Use the **Email Daily Report** screen to start or stop data collection and view various statistics about traffic passing through your UAG.

Note: Data collection may decrease the UAG's traffic throughput rate.

Click **Configuration > Log & Report > Email Daily Report** to display the following screen. Configure this screen to have the UAG e-mail you system statistics every day.

Figure 275 Configuration > Log & Report > Email Daily Report



The following table describes the labels in this screen.

Table 196 Configuration > Log & Report > Email Daily Report

LABEL	DESCRIPTION
Enable Email Daily Report	Select this to send reports by e-mail every day.
Mail Server	Type the name or IP address of the outgoing SMTP server.
Mail Subject	Type the subject line for the outgoing e-mail. Select **Append system name** to add the UAG's system name to the subject. Select **Append date time** to add the UAG's system date and time to the subject.
Mail From	Type the e-mail address from which the outgoing e-mail is delivered. This address is used in replies.
Mail To	Type the e-mail address (or addresses) to which the outgoing e-mail is delivered.
SMTP Authentication	Select this check box if it is necessary to provide a user name and password to the SMTP server.
User Name	This box is effective when you select the **SMTP Authentication** check box. Type the user name to provide to the SMTP server when the log is e-mailed.
Password	This box is effective when you select the **SMTP Authentication** check box. Type the password to provide to the SMTP server when the log is e-mailed.
Retype to Confirm	Retype your new password for confirmation.
Send Report Now	Click this button to have the UAG send the daily e-mail report immediately.
Time For Sending Report	Select the time of day (hours and minutes) when the log is e-mailed. Use 24-hour notation.
Report Items	Select the information to include in the report. Select **Reset counters after sending report successfully** if you only want to see statistics for a 24 hour period.
Reset All Counters	Click this to discard all report data and start all of the counters over at zero.
Apply	Click **Apply** to save your changes back to the UAG.
Reset	Click **Reset** to return the screen to its last-saved settings.

40.3 Log Settings Screens

The **Log Settings** screens control log messages and alerts. A log message stores the information for viewing or regular e-mailing later, and an alert is e-mailed immediately. Usually, alerts are used for events that require more serious attention, such as system errors and attacks.

The UAG provides a system log and supports e-mail profiles and remote syslog servers. View the system log in the **MONITOR > Log** screen. Use the e-mail profiles to mail log messages to the specific destinations. You can also have the UAG store system logs on a connected USB storage device. The other four logs are stored on specified syslog servers.

The **Log Settings** screens control what information the UAG saves in each log. You can also specify which log messages to e-mail for the system log, and where and how often to e-mail them. These screens also set for which events to generate alerts and where to email the alerts.

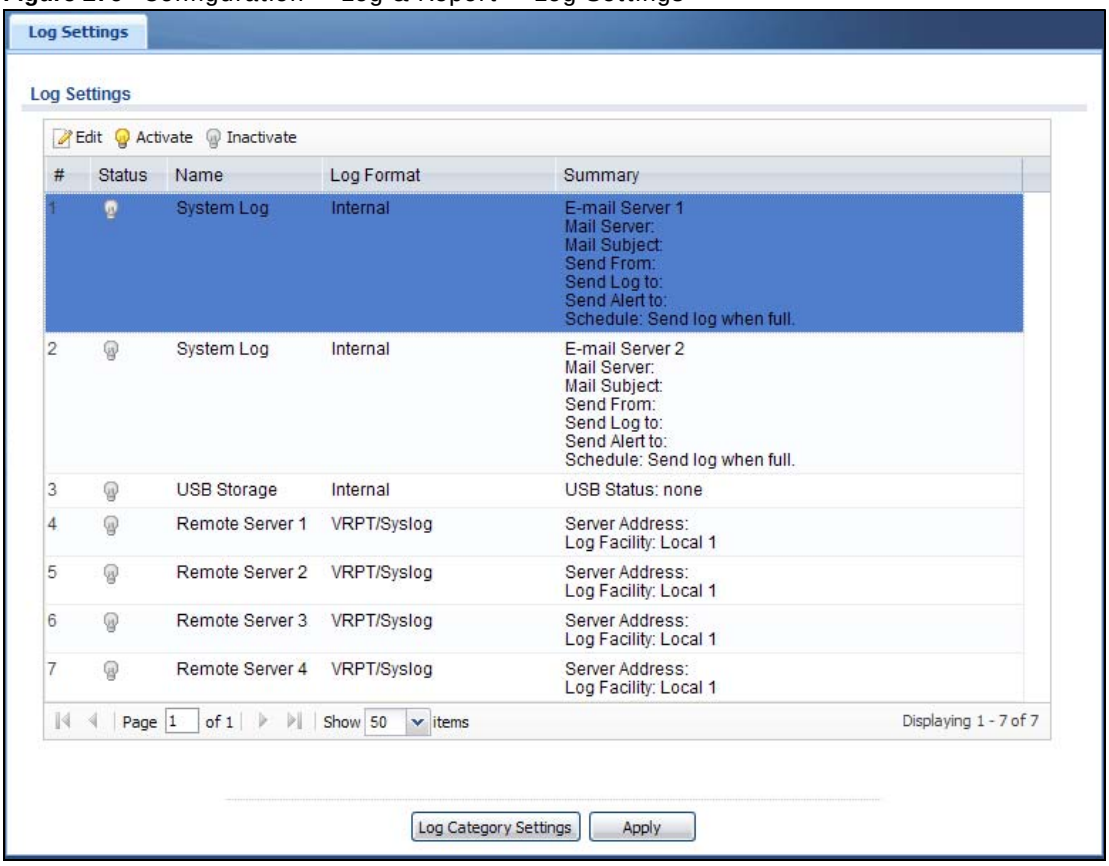
The first **Log Settings** screen provides a settings summary. Use the **Edit** screens to configure settings such as log categories, e-mail addresses, and server names for any log. Use the **Log**

Category Settings screen to edit what information is included in the system log, USB storage, e-mail profiles, and remote servers.

40.3.1 Log Settings Summary

To access this screen, click **Configuration > Log & Report > Log Settings**.

Figure 276 Configuration > Log & Report > Log Settings



The following table describes the labels in this screen.

Table 197 Configuration > Log & Report > Log Settings

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify it.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific log.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the type of log setting entry (system log, logs stored on a USB storage device connected to the UAG, or one of the remote servers).
Log Format	This field displays the format of the log. **Internal** - system log; you can view the log on the **View Log** tab. **VRPT/Syslog** - ZyXEL's Vantage Report, syslog-compatible format. **CEF/Syslog** - Common Event Format, syslog-compatible format.

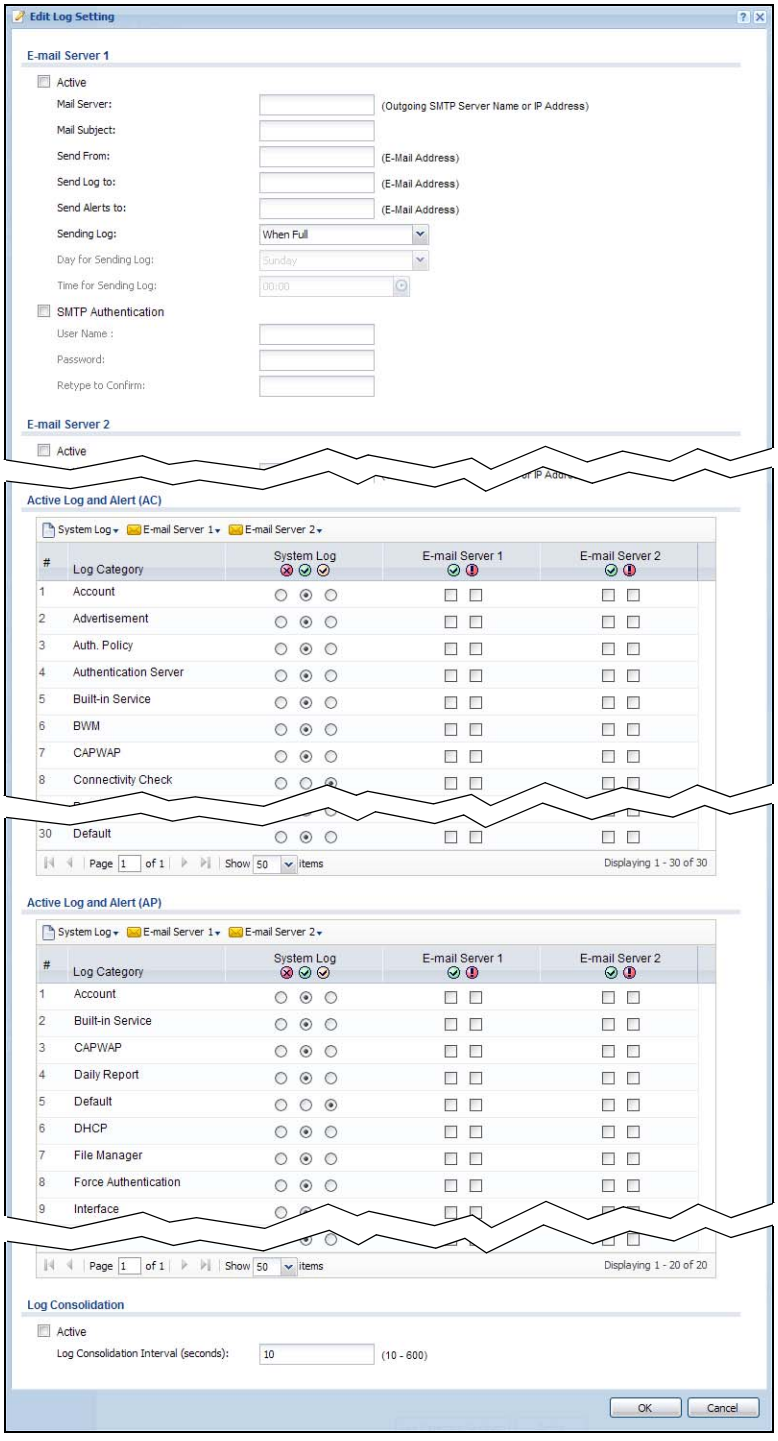
Table 197 Configuration > Log & Report > Log Settings (continued)

LABEL	DESCRIPTION
Summary	This field is a summary of the settings for each log. Please see Section 40.3.2 on page 389 for more information.
Log Category Settings	Click this button to open the **Log Category Settings** screen.
Apply	Click this button to save your changes (activate and deactivate logs) and make them take effect.

40.3.2 Edit System Log Settings

The **Log Settings Edit** screen controls the detailed settings for each log in the system log (which includes the e-mail profiles). Go to the **Log Settings Summary** screen (see Section 40.3.1 on page 388), and click the system log **Edit** icon.

Figure 277 Configuration > Log & Report > Log Settings > Edit (System Log)



The following table describes the labels in this screen.

Table 198 Configuration > Log & Report > Log Settings > Edit (System Log)

LABEL	DESCRIPTION
E-Mail Server 1/2	
Active	Select this to send log messages and alerts according to the information in this section. You specify what kinds of log messages are included in log information and what kinds of log messages are included in alerts in the **Active Log and Alert** section.
Mail Server	Type the name or IP address of the outgoing SMTP server.
Mail Subject	Type the subject line for the outgoing e-mail.
Send From	Type the e-mail address from which the outgoing e-mail is delivered. This address is used in replies.
Send Log To	Type the e-mail address to which the outgoing e-mail is delivered.
Send Alerts To	Type the e-mail address to which alerts are delivered.
Sending Log	Select how often log information is e-mailed. Choices are: **When Full**, **Hourly and When Full**, **Daily and When Full**, and **Weekly and When Full**.
Day for Sending Log	This field is available if the log is e-mailed weekly. Select the day of the week the log is e-mailed.
Time for Sending Log	This field is available if the log is e-mailed weekly or daily. Select the time of day (hours and minutes) when the log is e-mailed. Use 24-hour notation.
SMTP Authentication	Select this check box if it is necessary to provide a user name and password to the SMTP server.
User Name	This box is effective when you select the **SMTP Authentication** check box. Type the user name to provide to the SMTP server when the log is e-mailed.
Password	This box is effective when you select the **SMTP Authentication** check box. Type the password to provide to the SMTP server when the log is e-mailed.
Retype to Confirm	Retype your new password for confirmation.
Active Log and Alert	
System Log	Use the **System Log** drop-down list to change the log settings for all of the log categories. **disable all logs** (red X) - do not log any information for any category for the system log or e-mail any logs to e-mail server 1 or 2. **enable normal logs** (green check mark) - create log messages and alerts for all categories for the system log. If e-mail server 1 or 2 also has normal logs enabled, the UAG will e-mail logs to them. **enable normal logs and debug logs** (yellow check mark) - create log messages, alerts, and debugging information for all categories. The UAG does not e-mail debugging information, even if this setting is selected.
E-mail Server 1	Use the **E-Mail Server 1** drop-down list to change the settings for e-mailing logs to e-mail server 1 for all log categories. Using the **System Log** drop-down list to disable all logs overrides your e-mail server 1 settings. **enable normal logs** (green check mark) - e-mail log messages for all categories to e-mail server 1. **enable alert logs** (red exclamation point) - e-mail alerts for all categories to e-mail server 1.

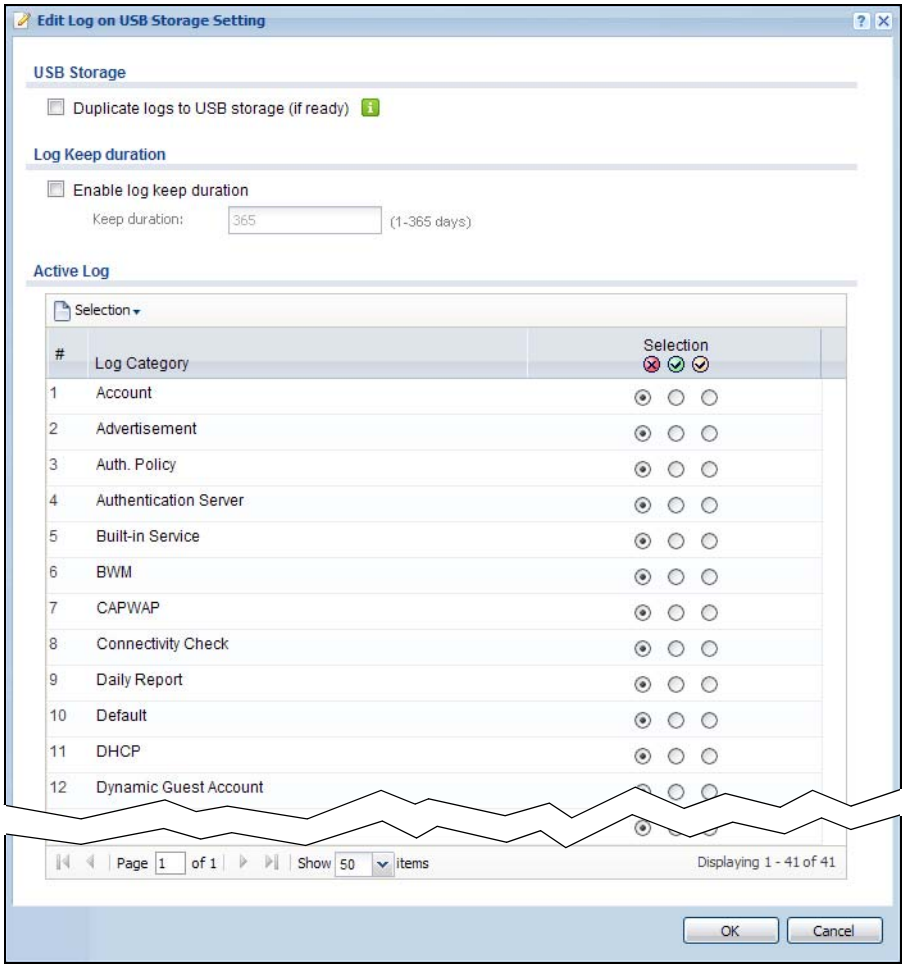
Table 198 Configuration > Log & Report > Log Settings > Edit (System Log) (continued)

LABEL	DESCRIPTION
E-mail Server 2	Use the **E-Mail Server 2** drop-down list to change the settings for e-mailing logs to e-mail server 2 for all log categories. Using the **System Log** drop-down list to disable all logs overrides your e-mail server 2 settings. **enable normal logs** (green check mark) - e-mail log messages for all categories to e-mail server 2. **enable alert logs** (red exclamation point) - e-mail alerts for all categories to e-mail server 2.
#	This field is a sequential value, and it is not associated with a specific address.
Log Category	This field displays each category of messages. It is the same value used in the **Display** and **Category** fields in the **View Log** tab. The **Default** category includes debugging messages generated by open source software.
System log	Select which events you want to log by **Log Category**. There are three choices: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - create log messages and alerts from this category **enable normal logs and debug logs** (yellow check mark) - create log messages, alerts, and debugging information from this category; the UAG does not e-mail debugging information, however, even if this setting is selected.
E-mail Server 1	Select whether each category of events should be included in the log messages when it is e-mailed (green check mark) and/or in alerts (red exclamation point) for the e-mail settings specified in **E-Mail Server 1**. The UAG does not e-mail debugging information, even if it is recorded in the **System log**.
E-mail Server 2	Select whether each category of events should be included in log messages when it is e-mailed (green check mark) and/or in alerts (red exclamation point) for the e-mail settings specified in **E-Mail Server 2**. The UAG does not e-mail debugging information, even if it is recorded in the **System log**.
Log Consolidation	
Active	Select this to activate log consolidation. Log consolidation aggregates multiple log messages that arrive within the specified **Log Consolidation Interval**. In the **View Log** tab, the text "[count=*x*]", where *x* is the number of original log messages, is appended at the end of the **Message** field, when multiple log messages were aggregated.
Log Consolidation Interval	Type how often, in seconds, to consolidate log information. If the same log message appears multiple times, it is aggregated into one log message with the text "[count=*x*]", where *x* is the number of original log messages, appended at the end of the **Message** field.
OK	Click this to save your changes and return to the previous screen.
Cancel	Click this to return to the previous screen without saving your changes.

40.3.3 Edit Log on USB Storage Setting

The **Edit Log on USB Storage Setting** screen controls the detailed settings for saving logs to a connected USB storage device. Go to the **Log Setting Summary** screen (see Section 40.3.1 on page 388), and click the USB storage **Edit** icon.

Figure 278 Configuration > Log & Report > Log Settings > Edit (USB Storage)



The following table describes the labels in this screen.

Table 199 Configuration > Log & Report > Log Settings > Edit (USB Storage)

LABEL	DESCRIPTION
Duplicate logs to USB storage (if ready)	Select this to have the UAG save a copy of its system logs to a connected USB storage device. Use the **Active Log** section to specify what kinds of messages to include.
Enable log keep duration	Select this option to have the UAG save a copy of its system logs to a connected USB storage device on a daily basis.
Keep duration	Specify how long the UAG is to keep the copy of system logs in the connected USB storage device before discarding it.
Active Log	
Selection	Use the **Selection** drop-down list to change the log settings for all of the log categories. **disable all logs** (red X) - do not send the remote server logs for any log category. **enable normal logs** (green check mark) - send the remote server log messages and alerts for all log categories. **enable normal logs and debug logs** (yellow check mark) - send the remote server log messages, alerts, and debugging information for all log categories.
#	This field is a sequential value, and it is not associated with a specific entry.

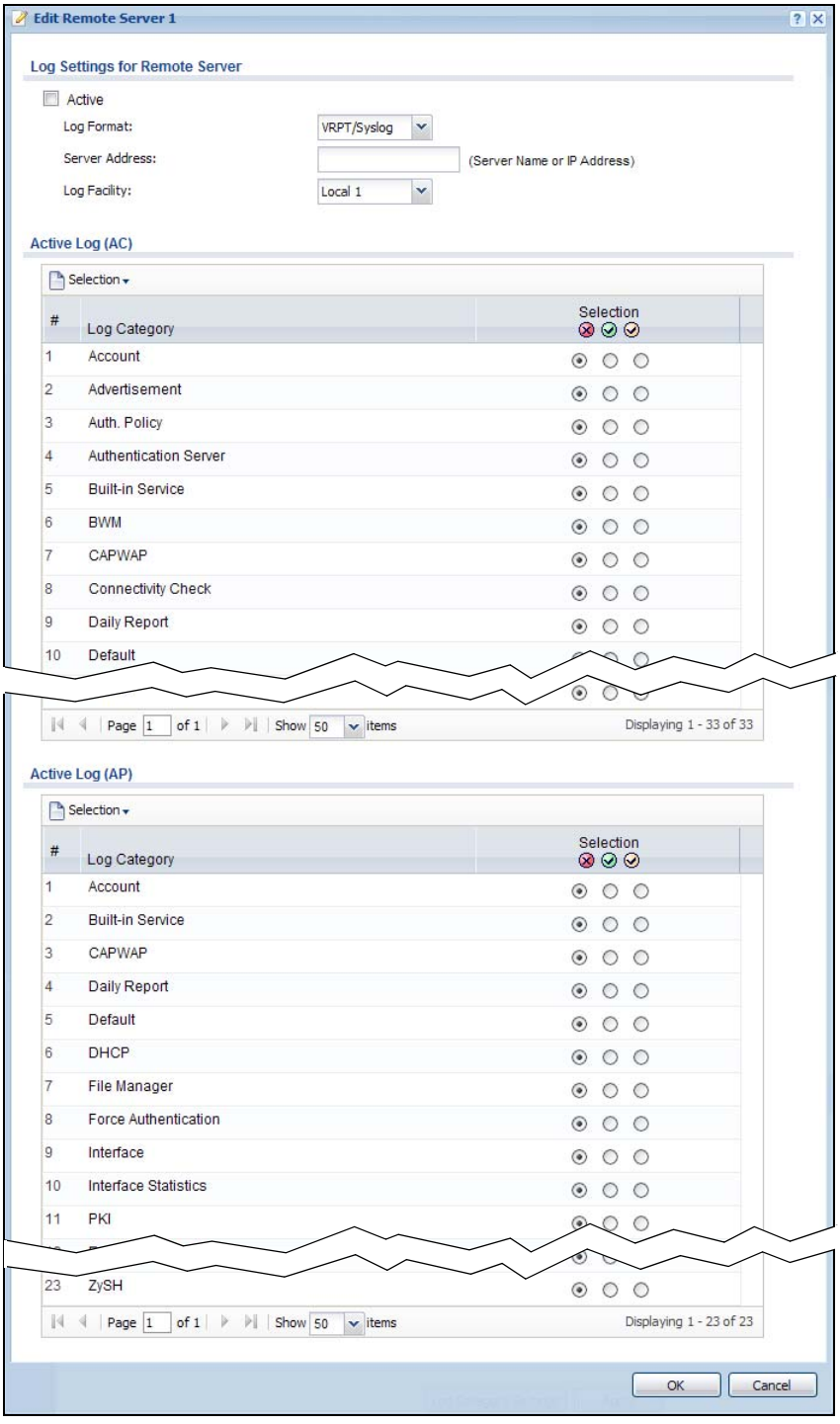
Table 199 Configuration > Log & Report > Log Settings > Edit (USB Storage) (continued)

LABEL	DESCRIPTION
Log Category	This field displays each category of messages. The **Default** category includes debugging messages generated by open source software.
Selection	Select what information you want to log from each **Log Category** (except **All Logs**; see below). Choices are: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - log regular information and alerts from this category **enable normal logs and debug logs** (yellow check mark) - log regular information, alerts, and debugging information from this category
OK	Click this to save your changes and return to the previous screen.
Cancel	Click this to return to the previous screen without saving your changes.

40.3.4 Edit Remote Server Log Settings

The **Log Settings Edit** screen controls the detailed settings for each log in the remote server (syslog). Go to the **Log Settings Summary** screen (see Section 40.3.1 on page 388), and click a remote server **Edit** icon.

Figure 279 Configuration > Log & Report > Log Settings > Edit (Remote Server)



The following table describes the labels in this screen.

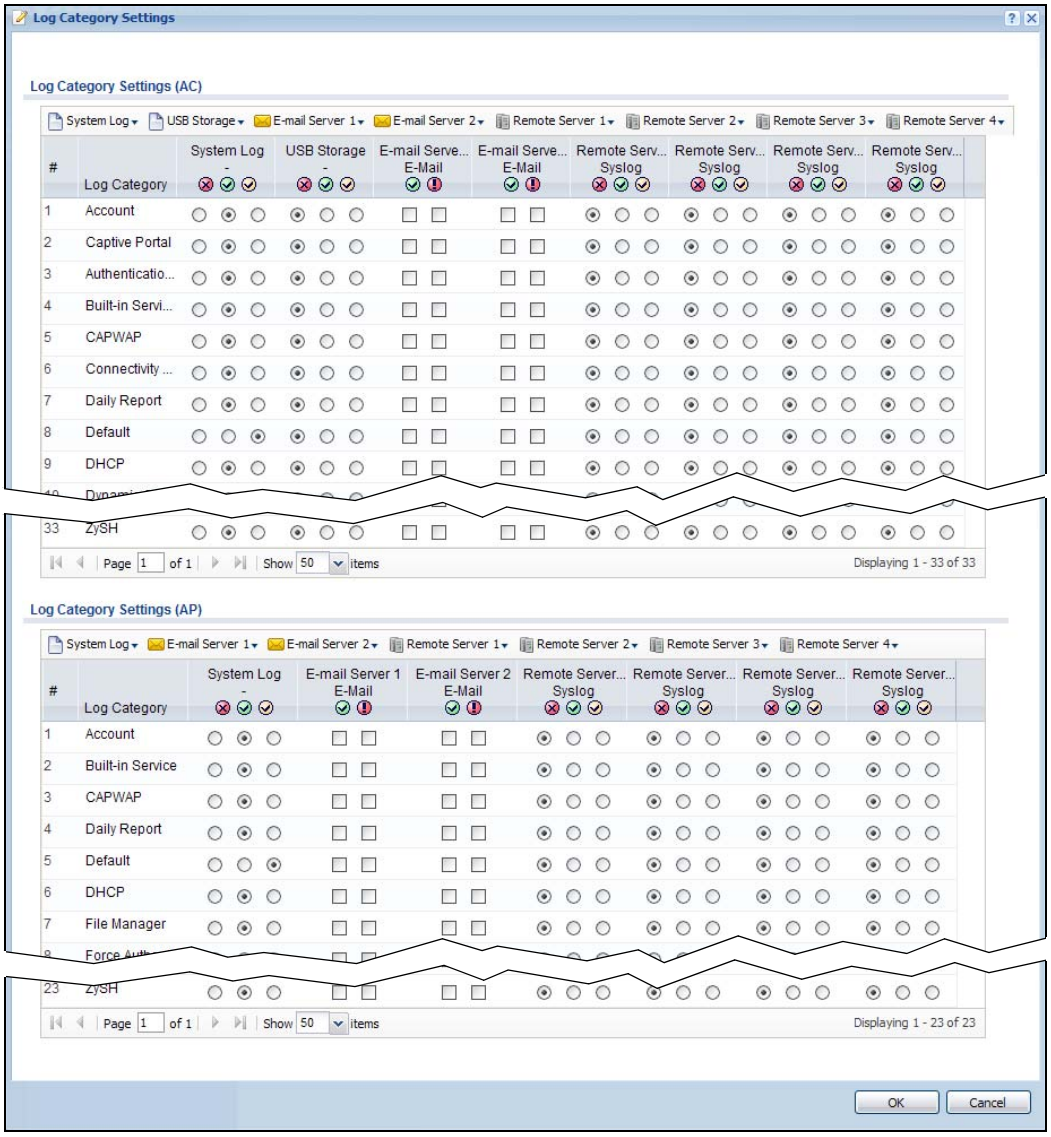
Table 200 Configuration > Log & Report > Log Setting > Edit (Remote Server)

LABEL	DESCRIPTION
Log Settings for Remote Server	
Active	Select this check box to send log information according to the information in this section. You specify what kinds of messages are included in log information in the **Active Log** section.
Log Format	This field displays the format of the log information. **VRPT / Syslog** - ZyXEL's Vantage Report, syslog-compatible format. **CEF / Syslog** - Common Event Format, syslog-compatible format.
Server Address	Type the server name or the IP address of the syslog server to which to send log information.
Log Facility	Select a log facility. The log facility allows you to log the messages to different files in the syslog server. Please see the documentation for your syslog program for more information.
Active Log	
Selection	Use the **Selection** drop-down list to change the log settings for all of the log categories. **disable all logs** (red X) - do not send the remote server logs for any log category. **enable normal logs** (green check mark) - send the remote server log messages and alerts for all log categories. **enable normal logs and debug logs** (yellow check mark) - send the remote server log messages, alerts, and debugging information for all log categories.
#	This field is a sequential value, and it is not associated with a specific address.
Log Category	This field displays each category of messages. It is the same value used in the **Display** and **Category** fields in the **View Log** tab. The **Default** category includes debugging messages generated by open source software.
Selection	Select what information you want to log from each **Log Category** (except **All Logs**; see below). Choices are: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - log regular information and alerts from this category **enable normal logs and debug logs** (yellow check mark) - log regular information, alerts, and debugging information from this category
OK	Click this to save your changes and return to the previous screen.
Cancel	Click this to return to the previous screen without saving your changes.

40.3.5 Log Category Settings Screen

This screen allows you to view and to edit what information is included in the system log, USB storage, e-mail profiles, and remote servers at the same time. It does not let you change other log settings (for example, where and how often log information is e-mailed or remote server names). To access this screen, go to the **Log Settings Summary** screen (see Section 40.3.1 on page 388), and click the **Log Category Settings** button.

Figure 280 Configuration > Log & Report > Log Setting > Log Category Settings



This screen provides a different view and a different way of indicating which messages are included in each log and each alert. Please see Section 40.3.2 on page 389, where this process is discussed. (The **Default** category includes debugging messages generated by open source software.)

The following table describes the fields in this screen.

Table 201 Configuration > Log & Report > Log Setting > Log Category Settings

LABEL	DESCRIPTION
System Log	Use the **System Log** drop-down list to change the log settings for all of the log categories. **disable all logs** (red X) - do not log any information for any category for the system log or e-mail any logs to e-mail server 1 or 2. **enable normal logs** (green check mark) - create log messages and alerts for all categories for the system log. If e-mail server 1 or 2 also has normal logs enabled, the UAG will e-mail logs to them. **enable normal logs and debug logs** (yellow check mark) - create log messages, alerts, and debugging information for all categories. The UAG does not e-mail debugging information, even if this setting is selected.
USB Storage	Use the **USB Storage** drop-down list to change the log settings for saving logs to a connected USB storage device. **disable all logs** (red X) - do not log any information for any category to a connected USB storage device. **enable normal logs** (green check mark) - create log messages and alerts for all categories and save them to a connected USB storage device. **enable normal logs and debug logs** (yellow check mark) - create log messages, alerts, and debugging information for all categories and save them to a connected USB storage device.
E-mail Server 1	Use the **E-Mail Server 1** drop-down list to change the settings for e-mailing logs to e-mail server 1 for all log categories. Using the **System Log** drop-down list to disable all logs overrides your e-mail server 1 settings. **enable normal logs** (green check mark) - e-mail log messages for all categories to e-mail server 1. **enable alert logs** (red exclamation point) - e-mail alerts for all categories to e-mail server 1.
E-mail Server 2	Use the **E-Mail Server 2** drop-down list to change the settings for e-mailing logs to e-mail server 2 for all log categories. Using the **System Log** drop-down list to disable all logs overrides your e-mail server 2 settings. **enable normal logs** (green check mark) - e-mail log messages for all categories to e-mail server 2. **enable alert logs** (red exclamation point) - e-mail alerts for all categories to e-mail server 2.
Remote Server 1~4	For each remote server, use the **Selection** drop-down list to change the log settings for all of the log categories. **disable all logs** (red X) - do not send the remote server logs for any log category. **enable normal logs** (green check mark) - send the remote server log messages and alerts for all log categories. **enable normal logs and debug logs** (yellow check mark) - send the remote server log messages, alerts, and debugging information for all log categories.
#	This field is a sequential value, and it is not associated with a specific address.
Log Category	This field displays each category of messages. It is the same value used in the **Display** and **Category** fields in the **View Log** tab. The **Default** category includes debugging messages generated by open source software.

Table 201 Configuration > Log & Report > Log Setting > Log Category Settings (continued)

LABEL	DESCRIPTION
System Log	Select which events you want to log by **Log Category**. There are three choices: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - create log messages and alerts from this category **enable normal logs and debug logs** (yellow check mark) - create log messages, alerts, and debugging information from this category; the UAG does not e-mail debugging information, however, even if this setting is selected.
USB Storage	Select which event log categories to save to a connected USB storage device. There are three choices: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - save log messages and alerts from this category **enable normal logs and debug logs** (yellow check mark) - save log messages, alerts, and debugging information from this category.
E-mail Server 1 E-mail	Select whether each category of events should be included in the log messages when it is e-mailed (green check mark) and/or in alerts (red exclamation point) for the e-mail settings specified in **E-Mail Server 1**. The UAG does not e-mail debugging information, even if it is recorded in the **System log**.
E-mail Server 2 E-mail	Select whether each category of events should be included in log messages when it is e-mailed (green check mark) and/or in alerts (red exclamation point) for the e-mail settings specified in **E-Mail Server 2**. The UAG does not e-mail debugging information, even if it is recorded in the **System log**.
Remote Server 1~4 Syslog	For each remote server, select what information you want to log from each **Log Category** (except **All Logs**; see below). Choices are: **disable all logs** (red X) - do not log any information from this category **enable normal logs** (green check mark) - log regular information and alerts from this category **enable normal logs and debug logs** (yellow check mark) - log regular information, alerts, and debugging information from this category
OK	Click this to save your changes and return to the previous screen.
Cancel	Click this to return to the previous screen without saving your changes.

41

File Manager

41.1 Overview

Configuration files define the UAG's settings. Shell scripts are files of commands that you can store on the UAG and run when you need them. You can apply a configuration file or run a shell script without the UAG restarting. You can store multiple configuration files and shell script files on the UAG. You can edit configuration files or shell scripts in a text editor and upload them to the UAG. Configuration files use a .conf extension and shell scripts use a .zysh extension.

41.1.1 What You Can Do in this Chapter

- Use the **Configuration File** screen (see Section 41.2 on page 402) to store and name configuration files. You can also download configuration files from the UAG to your computer and upload configuration files from your computer to the UAG.
- Use the **Firmware Package** screen (see Section 41.3 on page 406) to check your current firmware version and upload firmware to the UAG.
- Use the **Shell Script** screen (see Section 41.4 on page 408) to store, name, download, upload and run shell script files.

41.1.2 What you Need to Know

Configuration Files and Shell Scripts

When you apply a configuration file, the UAG uses the factory default settings for any features that the configuration file does not include. When you run a shell script, the UAG only applies the commands that it contains. Other settings do not change.

These files have the same syntax, which is also identical to the way you run CLI commands manually. An example is shown below.

Figure 281 Configuration File / Shell Script: Example

```
# enter configuration mode
configure terminal
# change administrator password
username admin password 4321 user-type admin
# configure wan1
interface wan1
ip address 10.16.17.240 255.255.255.0
ip gateway 10.16.17.254 metric 1
exit
# create address objects for remote management / to-Device firewall rules
# use the address group in case we want to open up remote management later
address-object TW_SUBNET 10.16.37.0/24
object-group address TW_TEAM
address-object TW_SUBNET
exit
# enable Telnet access (not enabled by default, unlike other services)
ip telnet server
# open WAN-to-Device firewall for TW_TEAM for remote management
firewall WAN Device insert 4
sourceip TW_TEAM
service TELNET
action allow
exit
write
```

While configuration files and shell scripts have the same syntax, the UAG applies configuration files differently than it runs shell scripts. This is explained below.

Table 202 Configuration Files and Shell Scripts in the UAG

Configuration Files (.conf)	Shell Scripts (.zysh)
• Resets to default configuration. • Goes into CLI **Configuration** mode. • Runs the commands in the configuration file.	• Goes into CLI **Privilege** mode. • Runs the commands in the shell script.

You have to run the example in Figure 281 on page 401 as a shell script because the first command is run in **Privilege** mode. If you remove the first command, you have to run the example as a configuration file because the rest of the commands are executed in **Configuration** mode.

Comments in Configuration Files or Shell Scripts

In a configuration file or shell script, use "#" or "!" as the first character of a command line to have the UAG treat the line as a comment.

Your configuration files or shell scripts can use "exit" or a command line consisting of a single "!" to have the UAG exit sub command mode.

Note: "exit" or "!'" must follow sub commands if it is to make the UAG exit sub command mode.

Line 3 in the following example exits sub command mode.

```
interface lan1
ip address dhcp
!
```

Lines 1 and 3 in the following example are comments and line 4 exits sub command mode.

```
!
interface lan1
# this interface is a DHCP client
!
```

Lines 1 and 2 are comments. Line 5 exits sub command mode.

```
! this is from Joe
# on 2008/04/05
interface lan1
ip address dhcp
!
```

Errors in Configuration Files or Shell Scripts

When you apply a configuration file or run a shell script, the UAG processes the file line-by-line. The UAG checks the first line and applies the line if no errors are detected. Then it continues with the next line. If the UAG finds an error, it stops applying the configuration file or shell script and generates a log.

You can change the way a configuration file or shell script is applied. Include `setenv stop-on-error off` in the configuration file or shell script. The UAG ignores any errors in the configuration file or shell script and applies all of the valid commands. The UAG still generates a log for any errors.

41.2 The Configuration File Screen

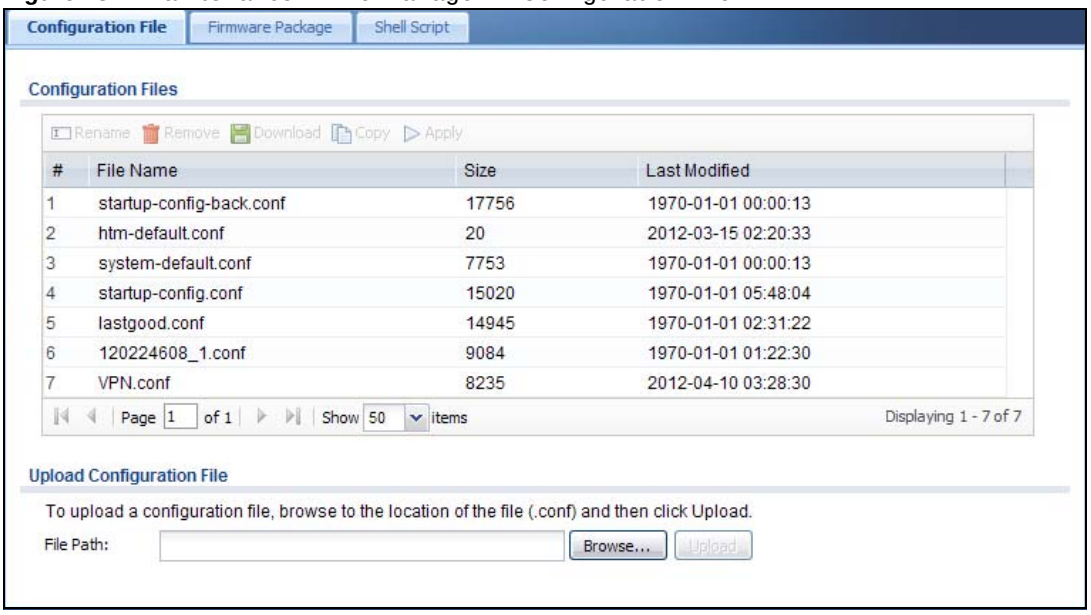
Click **Maintenance > File Manager > Configuration File** to open the **Configuration File** screen. Use the **Configuration File** screen to store, run, and name configuration files. You can also download configuration files from the UAG to your computer and upload configuration files from your computer to the UAG.

Once your UAG is configured and functioning properly, it is highly recommended that you back up your configuration file before making further configuration changes. The backup configuration file will be useful in case you need to return to your previous settings.

Configuration File Flow at Restart

- If there is not a **startup-config.conf** when you restart the UAG (whether through a management interface or by physically turning the power off and back on), the UAG uses the **system-default.conf** configuration file with the UAG's default settings.
- If there is a **startup-config.conf**, the UAG checks it for errors and applies it. If there are no errors, the UAG uses it and copies it to the **lastgood.conf** configuration file as a back up file. If there is an error, the UAG generates a log and copies the **startup-config.conf** configuration file to the **startup-config-bad.conf** configuration file and tries the existing **lastgood.conf** configuration file. If there isn't a **lastgood.conf** configuration file or it also has an error, the UAG applies the **system-default.conf** configuration file.
- You can change the way the **startup-config.conf** file is applied. Include the `setenv-startup stop-on-error off` command. The UAG ignores any errors in the **startup-config.conf** file and applies all of the valid commands. The UAG still generates a log for any errors.

Figure 282 Maintenance > File Manager > Configuration File



Do not turn off the UAG while configuration file upload is in progress.

The following table describes the labels in this screen.

Table 203 Maintenance > File Manager > Configuration File

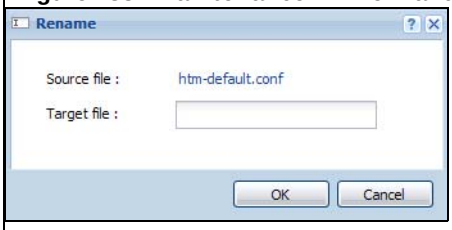
LABEL	DESCRIPTION
Rename	Use this button to change the label of a configuration file on the UAG. You can only rename manually saved configuration files. You cannot rename the **lastgood.conf**, **system-default.conf** and **startup-config.conf** files. You cannot rename a configuration file to the name of another configuration file in the UAG. Click a configuration file's row to select it and click **Rename** to open the **Rename File** screen. **Figure 283** Maintenance > File Manager > Configuration File > Rename  Specify the new name for the configuration file. Use up to 25 characters (including a-zA-Z0-9;'~!@#$%^&()_+[]{}',.=-). Click **OK** to save the duplicate or click **Cancel** to close the screen without saving a duplicate of the configuration file.
Remove	Click a configuration file's row to select it and click **Remove** to delete it from the UAG. You can only delete manually saved configuration files. You cannot delete the **system-default.conf**, **startup-config.conf** and **lastgood.conf** files. A pop-up window asks you to confirm that you want to delete the configuration file. Click **OK** to delete the configuration file or click **Cancel** to close the screen without deleting the configuration file.
Download	Click a configuration file's row to select it and click **Download** to save the configuration to your computer.
Copy	Use this button to save a duplicate of a configuration file on the UAG. Click a configuration file's row to select it and click **Copy** to open the **Copy File** screen. **Figure 284** Maintenance > File Manager > Configuration File > Copy Specify a name for the duplicate configuration file. Use up to 25 characters (including a-zA-Z0-9;'~!@#$%^&()_+[]{}',.=-). Click **OK** to save the duplicate or click **Cancel** to close the screen without saving a duplicate of the configuration file.

Table 203 Maintenance > File Manager > Configuration File (continued)

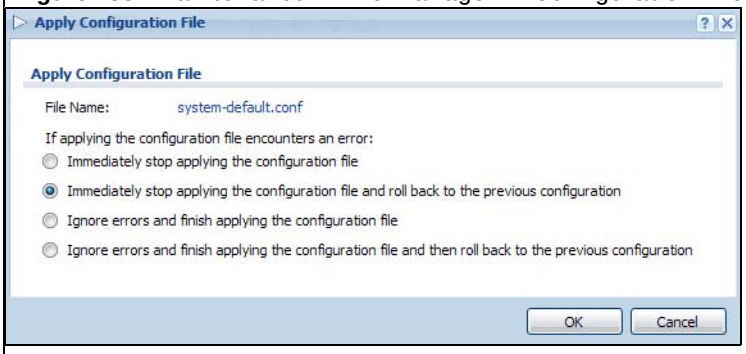
LABEL	DESCRIPTION
Apply	Use this button to have the UAG use a specific configuration file. Click a configuration file's row to select it and click **Apply** to have the UAG use that configuration file. The UAG does not have to restart in order to use a different configuration file, although you will need to wait for a few minutes while the system reconfigures. The following screen gives you options for what the UAG is to do if it encounters an error in the configuration file. **Figure 285** Maintenance > File Manager > Configuration File > Apply  **Immediately stop applying the configuration file** - this is not recommended because it would leave the rest of the configuration blank. If the interfaces were not configured before the first error, the console port may be the only way to access the device. **Immediately stop applying the configuration file and roll back to the previous configuration** - this gets the UAG started with a fully valid configuration file as quickly as possible. **Ignore errors and finish applying the configuration file** - this applies the valid parts of the configuration file and generates error logs for all of the configuration file's errors. This lets the UAG apply most of your configuration and you can refer to the logs for what to fix. **Ignore errors and finish applying the configuration file and then roll back to the previous configuration** - this applies the valid parts of the configuration file, generates error logs for all of the configuration file's errors, and starts the UAG with a fully valid configuration file. Click **OK** to have the UAG start applying the configuration file or click **Cancel** to close the screen
#	This column displays the number for each configuration file entry. This field is a sequential value, and it is not associated with a specific address. The total number of configuration files that you can save depends on the sizes of the configuration files and the available flash storage space.

Table 203 Maintenance > File Manager > Configuration File (continued)

LABEL	DESCRIPTION
File Name	This column displays the label that identifies a configuration file. You cannot delete the following configuration files or change their file names. The **system-default.conf** file contains the UAG's default settings. Select this file and click **Apply** to reset all of the UAG settings to the factory defaults. This configuration file is included when you upload a firmware package. The **startup-config.conf** file is the configuration file that the UAG is currently using. If you make and save changes during your management session, the changes are applied to this configuration file. The UAG applies configuration changes made in the Web Configurator to the configuration file when you click **Apply** or **OK**. It applies configuration changes made via commands when you use the `write` command. The **lastgood.conf** is the most recently used (valid) configuration file that was saved when the device last restarted. If you upload and apply a configuration file with an error, you can apply lastgood.conf to return to a valid configuration.
Size	This column displays the size (in KB) of a configuration file.
Last Modified	This column displays the date and time that the individual configuration files were last changed or saved.
Upload Configuration File	The bottom part of the screen allows you to upload a new or previously saved configuration file from your computer to your UAG You cannot upload a configuration file named **system-default.conf** or **lastgood.conf**. If you upload **startup-config.conf**, it will replace the current configuration and immediately apply the new settings.
File Path	Type in the location of the file you want to upload in this field or click **Browse ...** to find it.
Browse...	Click **Browse...** to find the .conf file you want to upload. The configuration file must use a ".conf" filename extension. You will receive an error message if you try to upload a fie of a different format. Remember that you must decompress compressed (.zip) files before you can upload them.
Upload	Click **Upload** to begin the upload process. This process may take up to two minutes.

41.3 The Firmware Package Screen

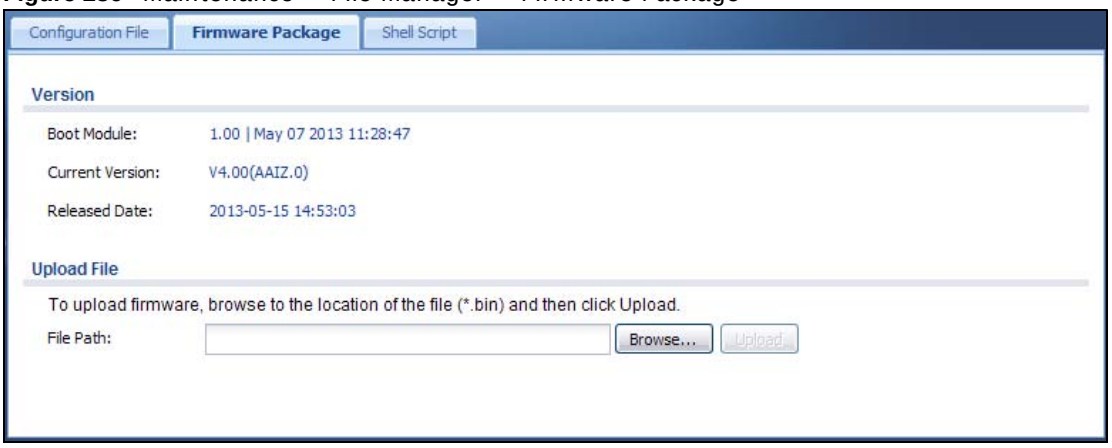
Click **Maintenance > File Manager > Firmware Package** to open the **Firmware Package** screen. Use the **Firmware Package** screen to check your current firmware version and upload firmware to the UAG.

Note: The Web Configurator is the recommended method for uploading firmware. You only need to use the command line interface if you need to recover the firmware. See the CLI Reference Guide for how to determine if you need to recover the firmware and how to recover it.

Find the firmware package at www.zyxel.com in a file that (usually) uses the system model name with a .bin extension, for example, "UAG.bin".

The firmware update can take up to five minutes. Do not turn off or reset the UAG while the firmware update is in progress!

Figure 286 Maintenance > File Manager > Firmware Package



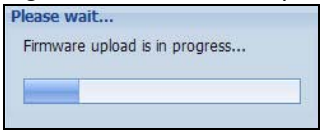
The following table describes the labels in this screen.

Table 204 Maintenance > File Manager > Firmware Package

LABEL	DESCRIPTION
Boot Module	This is the version of the boot module that is currently on the UAG.
Current Version	This is the firmware version and the date created.
Released Date	This is the date that the version of the firmware was created.
File Path	Type in the location of the file you want to upload in this field or click **Browse ...** to find it.
Browse...	Click **Browse...** to find the .bin file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Upload	Click **Upload** to begin the upload process. This process may take up to two minutes.

After you see the **Firmware Upload in Process** screen, wait two minutes before logging into the UAG again.

Figure 287 Firmware Upload In Process



Note: The UAG automatically reboots after a successful upload.

The UAG automatically restarts causing a temporary network disconnect. In some operating systems, you may see the following icon on your desktop.

Figure 288 Network Temporarily Disconnected

After five minutes, log in again and check your new firmware version in the **Dashboard** screen.

If the upload was not successful, the following message appears in the status bar at the bottom of the screen.

Figure 289 Firmware Upload Error

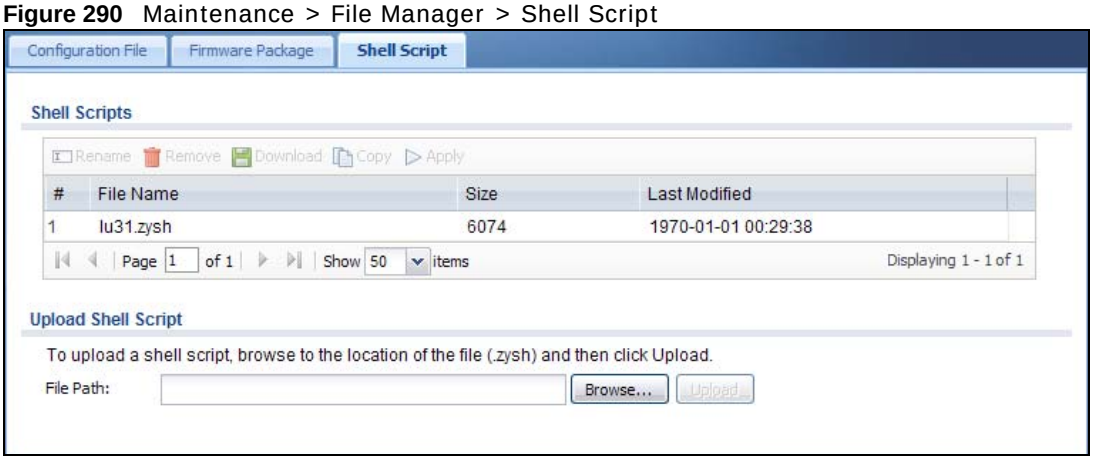
41.4 The Shell Script Screen

Use shell script files to have the UAG use commands that you specify. Use a text editor to create the shell script files. They must use a ".zysh" filename extension.

Click **Maintenance > File Manager > Shell Script** to open the **Shell Script** screen. Use the **Shell Script** screen to store, name, download, upload and run shell script files. You can store multiple shell script files on the UAG at the same time.

Note: You should include `write` commands in your scripts. If you do not use the `write` command, the changes will be lost when the UAG restarts. You could use multiple `write` commands in a long script.

Figure 290 Maintenance > File Manager > Shell Script



Each field is described in the following table.

Table 205 Maintenance > File Manager > Shell Script

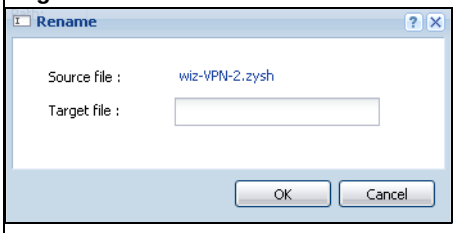
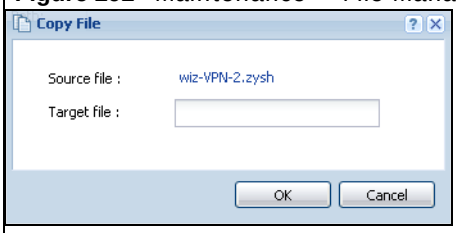
LABEL	DESCRIPTION
Rename	Use this button to change the label of a shell script file on the UAG. You cannot rename a shell script to the name of another shell script in the UAG. Click a shell script's row to select it and click **Rename** to open the **Rename File** screen. **Figure 291** Maintenance > File Manager > Shell Script > Rename  Specify the new name for the shell script file. Use up to 25 characters (including a-zA-Z0-9;'~!@#$%^&()_+[]{}',.=-). Click **OK** to save the duplicate or click **Cancel** to close the screen without saving a duplicate of the configuration file.
Remove	Click a shell script file's row to select it and click **Remove** to delete the shell script file from the UAG. A pop-up window asks you to confirm that you want to delete the shell script file. Click **OK** to delete the shell script file or click **Cancel** to close the screen without deleting the shell script file.
Download	Click a shell script file's row to select it and click **Download** to save the configuration to your computer.
Copy	Use this button to save a duplicate of a shell script file on the UAG. Click a shell script file's row to select it and click **Copy** to open the **Copy File** screen. **Figure 292** Maintenance > File Manager > Shell Script > Copy  Specify a name for the duplicate file. Use up to 25 characters (including a-zA-Z0-9;'~!@#$%^&()_+[]{}',.=-). Click **OK** to save the duplicate or click **Cancel** to close the screen without saving a duplicate of the configuration file.
Apply	Use this button to have the UAG use a specific shell script file. Click a shell script file's row to select it and click **Apply** to have the UAG use that shell script file. You may need to wait awhile for the UAG to finish applying the commands.
#	This column displays the number for each shell script file entry.
File Name	This column displays the label that identifies a shell script file.
Size	This column displays the size (in KB) of a shell script file.
Last Modified	This column displays the date and time that the individual shell script files were last changed or saved.

Table 205 Maintenance > File Manager > Shell Script (continued)

LABEL	DESCRIPTION
Upload Shell Script	The bottom part of the screen allows you to upload a new or previously saved shell script file from your computer to your UAG.
File Path	Type in the location of the file you want to upload in this field or click **Browse ...** to find it.
Browse...	Click **Browse...** to find the .zysh file you want to upload.
Upload	Click **Upload** to begin the upload process. This process may take up to several minutes.

42

Diagnostics

42.1 Overview

Use the diagnostics screens for troubleshooting.

42.1.1 What You Can Do in this Chapter

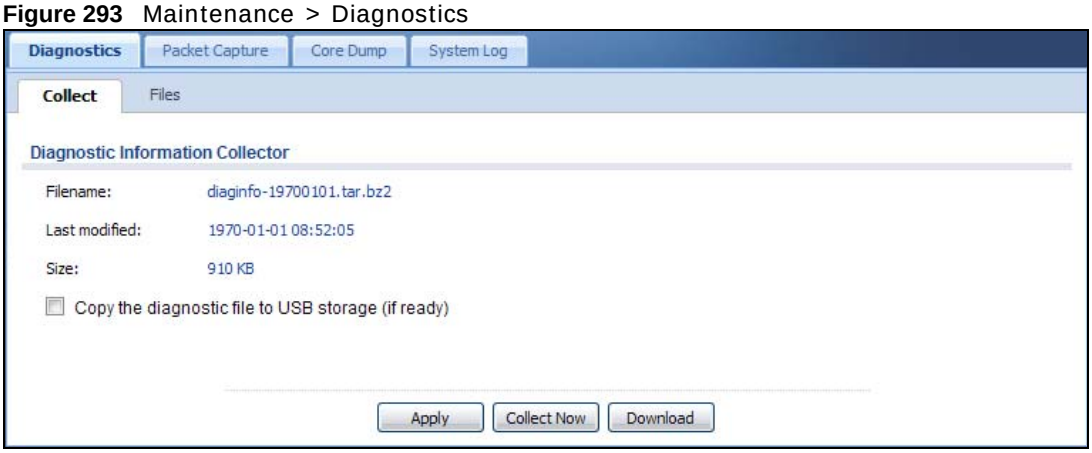
- Use the **Diagnostics** screen (see Section 42.2 on page 411) to generate a file containing the UAG's configuration and diagnostic information if you need to provide it to customer support during troubleshooting.
- Use the **Packet Capture** screens (see Section 42.3 on page 413) to capture packets going through the UAG.
- Use the **Core Dump** screens (see Section 42.4 on page 416) to have the UAG save a process's core dump to an attached USB storage device if the process terminates abnormally (crashes) so you can send the file to customer support for troubleshooting.
- Use the **System Log** screens (see Section 42.5 on page 417) to download files of system logs from a connected USB storage device to your computer.

42.2 The Diagnostics Screen

The **Diagnostic** screen provides an easy way for you to generate a file containing the UAG's configuration and diagnostic information. You may need to send this file to customer support for troubleshooting.

Click **Maintenance > Diagnostics** to open the **Diagnostic** screen.

Figure 293 Maintenance > Diagnostics



The following table describes the labels in this screen.

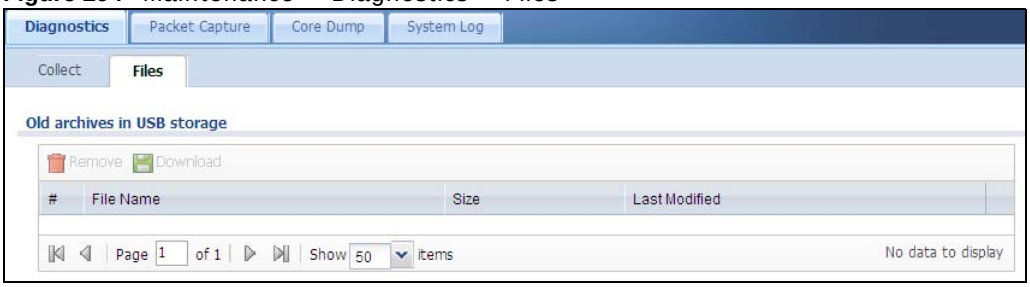
Table 206 Maintenance > Diagnostics

LABEL	DESCRIPTION
Filename	This is the name of the most recently created diagnostic file.
Last modified	This is the date and time that the last diagnostic file was created. The format is yyyy-mm-dd hh:mm:ss.
Size	This is the size of the most recently created diagnostic file.
Copy the diagnostic file to USB storage (if ready)	Select this to have the UAG create an extra copy of the diagnostic file to a connected USB storage device.
Apply	Click **Apply** to save your changes.
Collect Now	Click this to have the UAG create a new diagnostic file.
Download	Click this to save the most recent diagnostic file to a computer.

42.2.1 The Diagnostics Files Screen

Click **Maintenance > Diagnostics > Files** to open the diagnostic files screen. This screen lists the files of diagnostic information the UAG has collected and stored in a connected USB storage device. You may need to send these files to customer support for troubleshooting.

Figure 294 Maintenance > Diagnostics > Files



The following table describes the labels in this screen.

Table 207 Maintenance > Diagnostics > Files

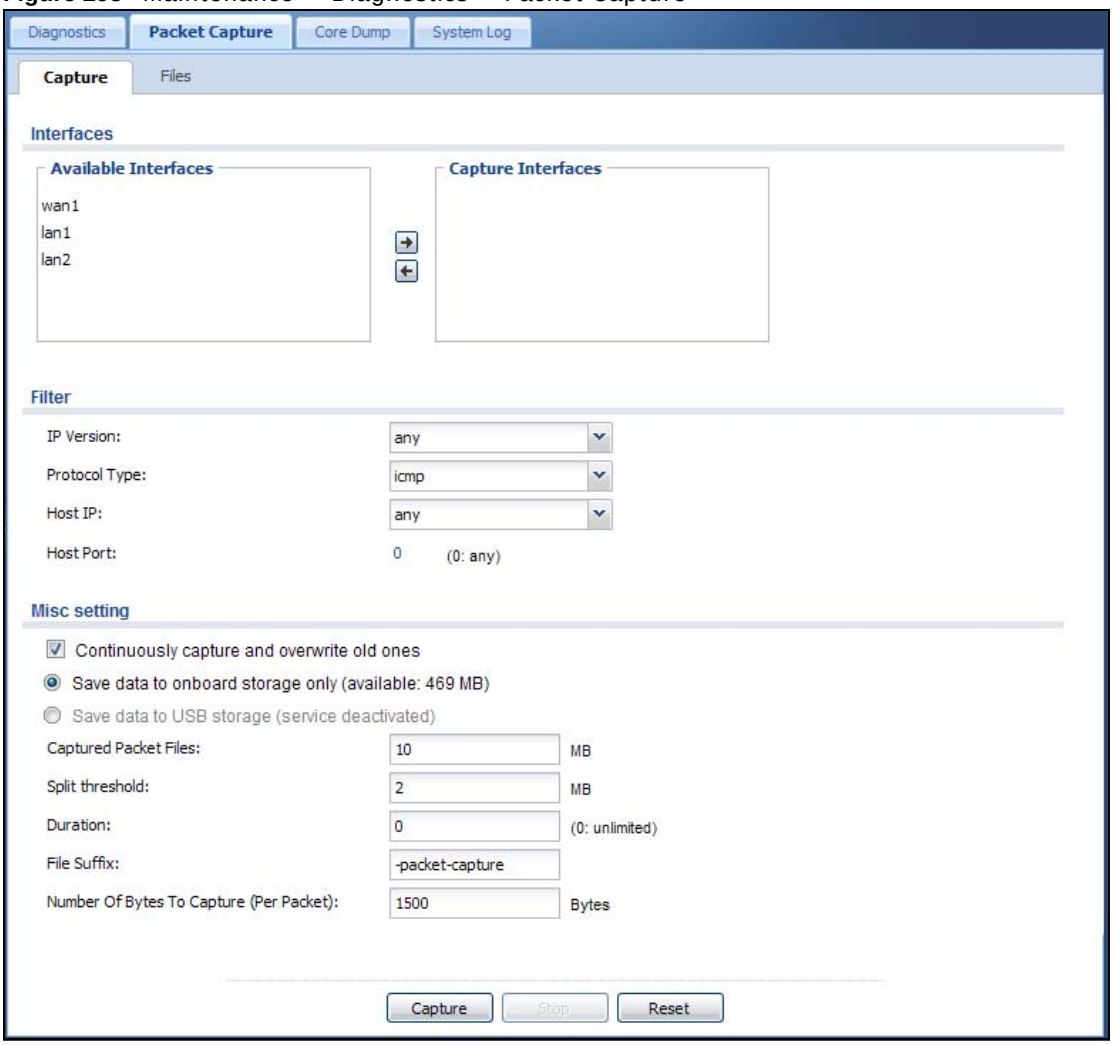
LABEL	DESCRIPTION
Remove	Select files and click **Remove** to delete them from the UAG. Use the [Shift] and/or [Ctrl] key to select multiple files. A pop-up window asks you to confirm that you want to delete.
Download	Click a file to select it and click **Download** to save it to your computer.
#	This column displays the number for each file entry. The total number of files that you can save depends on the file sizes and the available storage space.
File Name	This column displays the label that identifies the file.
Size	This column displays the size (in bytes) of a file.
Last Modified	This column displays the date and time that the individual files were saved.

42.3 The Packet Capture Screen

Use this screen to capture network traffic going through the UAG's interfaces. Studying these packet captures may help you identify network problems. Click **Maintenance > Diagnostics > Packet Capture** to open the packet capture screen.

Note: New capture files overwrite existing files of the same name. Change the **File Suffix** field's setting to avoid this.

Figure 295 Maintenance > Diagnostics > Packet Capture



The following table describes the labels in this screen.

Table 208 Maintenance > Diagnostics > Packet Capture

LABEL	DESCRIPTION
Interfaces	Enabled interfaces (except for virtual interfaces) appear under **Available Interfaces**. Select interfaces for which to capture packets and click the right arrow button to move them to the **Capture Interfaces** list. Use the [Shift] and/or [Ctrl] key to select multiple objects.
IP Version	Select the version of the Internet Protocol (IP) by which traffic is routed across the networks and Internet. Select **any** to capture packets for traffic sent by either IP version.
Protocol Type	Select the protocol type of traffic for which to capture packets. Select **any** to capture packets for all types of traffic.
Host IP	Select a host IP address object for which to capture packets. Select **any** to capture packets for all hosts. Select **User Defined** to be able to enter an IP address.
Host Port	This field is configurable when you set the **Protocol Type** to **any**, **tcp**, or **udp**. Specify the port number of traffic to capture.
Continuously capture and overwrite old ones	Select this to have the UAG keep capturing traffic and overwriting old packet capture entries when the available storage space runs out.
Save data to onboard storage only	Select this to have the UAG only store packet capture entries on the UAG. The available storage size is displayed as well. Note: The UAGL reserves some onboard storage space as a buffer.
Save data to USB storage	Select this to have the UAG store packet capture entries only on a USB storage device connected to the UAG. Status: **Unused** - the connected USB storage device was manually unmounted by using the **Remove Now** button or for some reason the UAG cannot mount it. **none** - no USB storage device is connected. **available** - you can have the UAG use the USB storage device. The available storage capacity also displays. **service deactivated** - the USB storage feature is disabled and the UAG cannot use a connected USB device to store the system log and other diagnostic information. Note: The UAG reserves some USB storage space as a buffer.
Captured Packet Files	When saving packet captures only to the UAG's onboard storage, specify a maximum limit in megabytes for the total combined size of all the capture files on the UAG. When saving packet captures to a connected USB storage device, specify a maximum limit in megabytes for each capture file. Note: If you have existing capture files and have not selected the **Continuously capture and overwrite old ones** option, you may need to set this size larger or delete existing capture files. The valid range depends on the available onboard/USB storage size. The UAG stops the capture and generates the capture file when either the file reaches this size or the time period specified in the **Duration** field expires.
Split threshold	Specify a maximum size limit in megabytes for individual packet capture files. After a packet capture file reaches this size, the UAG starts another packet capture file.
Duration	Set a time limit in seconds for the capture. The UAG stops the capture and generates the capture file when either this period of time has passed or the file reaches the size specified in the **File Size** field. 0 means there is no time limit.

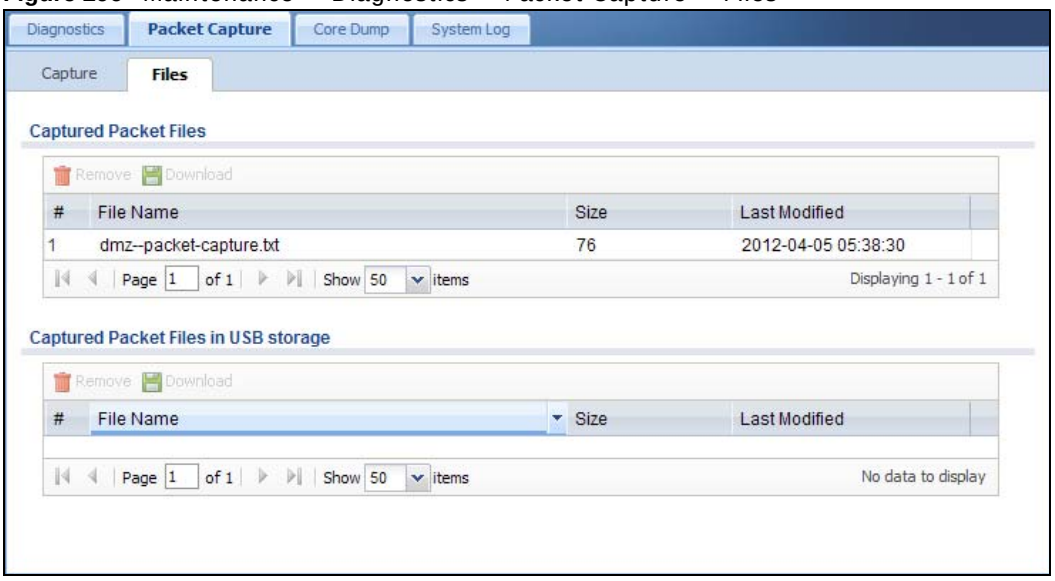
Table 208 Maintenance > Diagnostics > Packet Capture (continued)

LABEL	DESCRIPTION
File Suffix	Specify text to add to the end of the file name (before the dot and filename extension) to help you identify the packet capture files. Modifying the file suffix also avoids making new capture files that overwrite existing files of the same name. The file name format is “interface name-file suffix.cap”, for example “vlan2-packet-capture.cap”.
Number Of Bytes To Capture (Per Packet)	Specify the maximum number of bytes to capture per packet. The UAG automatically truncates packets that exceed this size. As a result, when you view the packet capture files in a packet analyzer, the actual size of the packets may be larger than the size of captured packets.
Capture	Click this button to have the UAG capture packets according to the settings configured in this screen. You can configure the UAG while a packet capture is in progress although you cannot modify the packet capture settings. The UAG’s throughput or performance may be affected while a packet capture is in progress. After the UAG finishes the capture it saves a separate capture file for each selected interface. The total number of packet capture files that you can save depends on the file sizes and the available flash storage space. Once the flash storage space is full, adding more packet captures will fail.
Stop	Click this button to stop a currently running packet capture and generate a separate capture file for each selected interface.
Reset	Click this button to return the screen to its last-saved settings.

42.3.1 The Packet Capture Files Screen

Click **Maintenance > Diagnostics > Packet Capture > Files** to open the packet capture files screen. This screen lists the files of packet captures stored on the UAG or a connected USB storage device. You can download the files to your computer where you can study them using a packet analyzer (also known as a network or protocol analyzer) such as Wireshark.

Figure 296 Maintenance > Diagnostics > Packet Capture > Files



The following table describes the labels in this screen.

Table 209 Maintenance > Diagnostics > Packet Capture > Files

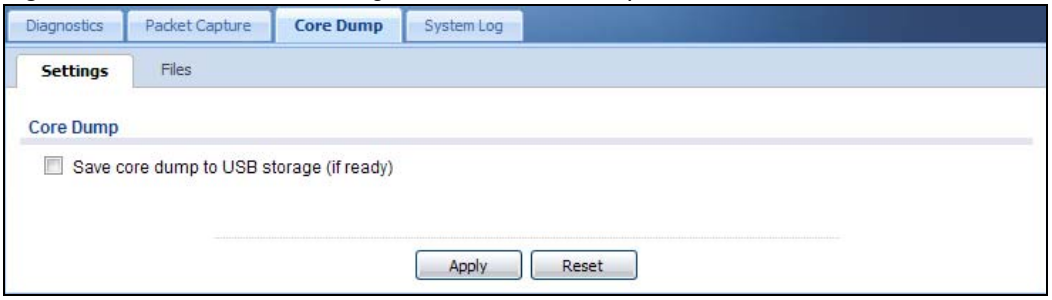
LABEL	DESCRIPTION
Remove	Select files and click **Remove** to delete them from the UAG or the connected USB storage device. Use the [Shift] and/or [Ctrl] key to select multiple files. A pop-up window asks you to confirm that you want to delete.
Download	Click a file to select it and click **Download** to save it to your computer.
#	This column displays the number for each packet capture file entry. The total number of packet capture files that you can save depends on the file sizes and the available flash storage space.
File Name	This column displays the label that identifies the file. The file name format is interface name-file suffix.cap.
Size	This column displays the size (in bytes) of a configuration file.
Last Modified	This column displays the date and time that the individual files were saved.

42.4 Core Dump Screen

Use the **Core Dump** screen to have the UAG save a process's core dump to an attached USB storage device if the process terminates abnormally (crashes). You may need to send this file to customer support for troubleshooting.

Click **Maintenance > Diagnostics > Core Dump** to open the following screen.

Figure 297 Maintenance > Diagnostics > Core Dump



The following table describes the labels in this screen.

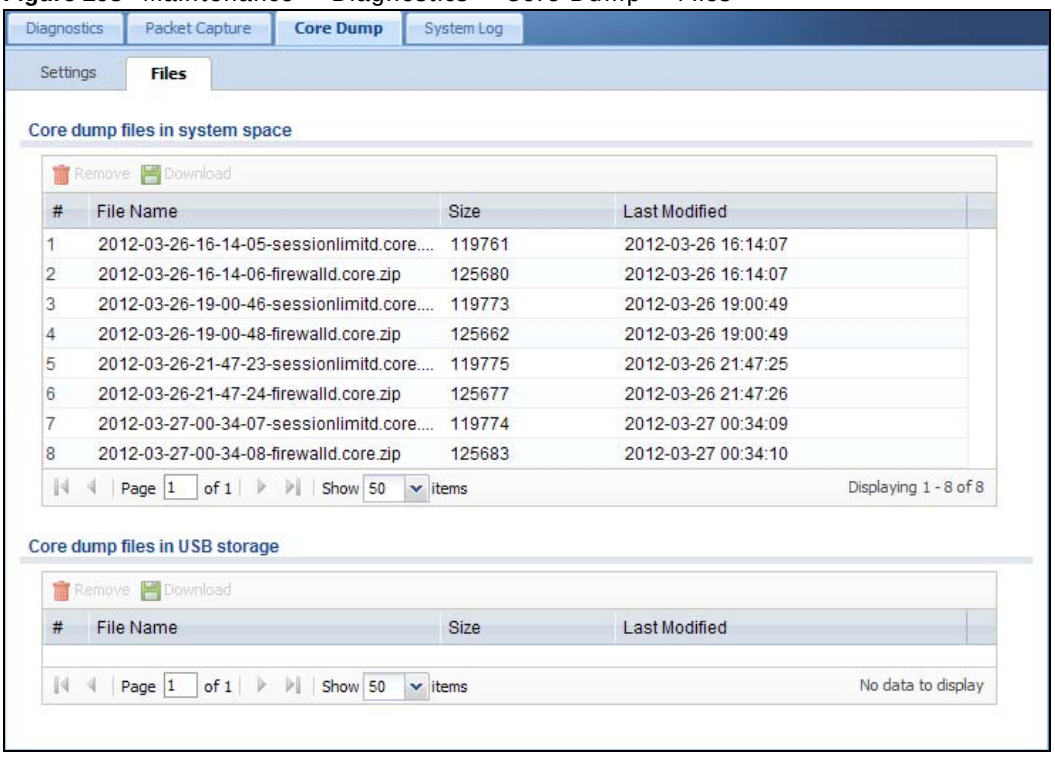
Table 210 Maintenance > Diagnostics > Core Dump

LABEL	DESCRIPTION
Save core dump to USB storage (if ready)	Select this to have the UAG save a process's core dump to an attached USB storage device if the process terminates abnormally (crashes). If you clear this option the UAG only saves
Apply	Click **Apply** to save the changes.
Reset	Click **Reset** to return the screen to its last-saved settings.

42.4.1 Core Dump Files Screen

Click **Maintenance > Diagnostics > Core Dump > Files** to open the core dump files screen. This screen lists the core dump files stored on the UAG or a connected USB storage device. You may need to send these files to customer support for troubleshooting.

Figure 298 Maintenance > Diagnostics > Core Dump > Files



The following table describes the labels in this screen.

Table 211 Maintenance > Diagnostics > Core Dump > Files

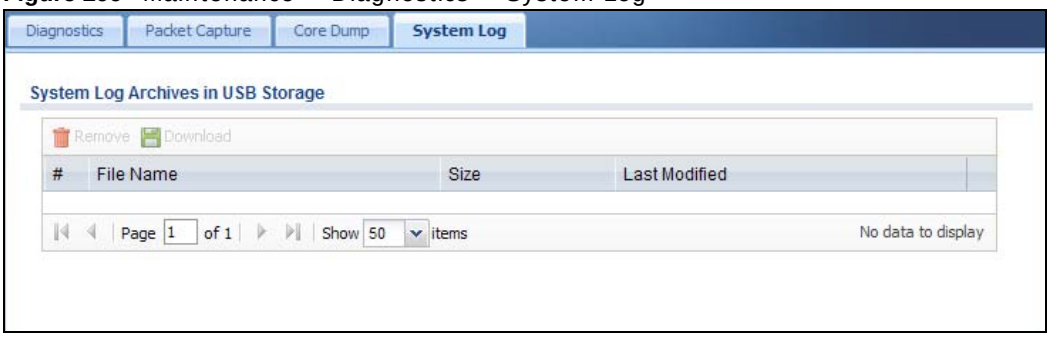
LABEL	DESCRIPTION
Remove	Select files and click **Remove** to delete them from the UAG. Use the [Shift] and/or [Ctrl] key to select multiple files. A pop-up window asks you to confirm that you want to delete.
Download	Click a file to select it and click **Download** to save it to your computer.
#	This column displays the number for each packet capture file entry. The total number of packet capture files that you can save depends on the file sizes and the available flash storage space.
File Name	This column displays the label that identifies the file.
Size	This column displays the size (in bytes) of a file.
Last Modified	This column displays the date and time that the individual files were saved.

42.5 The System Log Screen

Click **Maintenance > Diagnostics > System Log** to open the system log files screen. This screen lists the files of system logs stored on a connected USB storage device. The files are in comma

separated value (csv) format. You can download them to your computer and open them in a tool like Microsoft's Excel.

Figure 299 Maintenance > Diagnostics > System Log



The following table describes the labels in this screen.

Table 212 Maintenance > Diagnostics > System Log

LABEL	DESCRIPTION
Remove	Select files and click **Remove** to delete them from the UAG. Use the [Shift] and/or [Ctrl] key to select multiple files. A pop-up window asks you to confirm that you want to delete.
Download	Click a file to select it and click **Download** to save it to your computer.
#	This column displays the number for each file entry. The total number of files that you can save depends on the file sizes and the available storage space.
File Name	This column displays the label that identifies the file.
Size	This column displays the size (in bytes) of a file.
Last Modified	This column displays the date and time that the individual files were saved.

43

Packet Flow Explore

43.1 Overview

Use this to get a clear picture on how the UAG determines where to forward a packet and how to change the source IP address of the packet according to your current settings. This function provides you a summary of all your routing and SNAT settings and helps troubleshoot any related problems.

43.1.1 What You Can Do in this Chapter

- Use the **Routing Status** screen (see Section 43.2 on page 419) to view the overall routing flow and each routing function's settings.
- Use the **SNAT Status** screen (see Section 43.3 on page 423) to view the overall source IP address conversion (SNAT) flow and each SNAT function's settings.

43.2 The Routing Status Screen

The **Routing Status** screen allows you to view the current routing flow and quickly link to specific routing settings. Click a function box in the **Routing Flow** section, the related routes (activated) will display in the **Routing Table** section. To access this screen, click **Maintenance** > **Packet Flow Explore**.

The order of the routing flow may vary depending on whether you:

- select **use policy route to override direct route** in the **CONFIGURATION > Network > Routing > Policy Route** screen.
- use policy routes to control 1-1 NAT by using the `policy control-virtual-server-rules activate` command.

Note: Once a packet matches the criteria of a routing rule, the UAG takes the corresponding action and does not perform any further flow checking.

Figure 300 Maintenance > Packet Flow Explore > Routing Status (Direct Route)

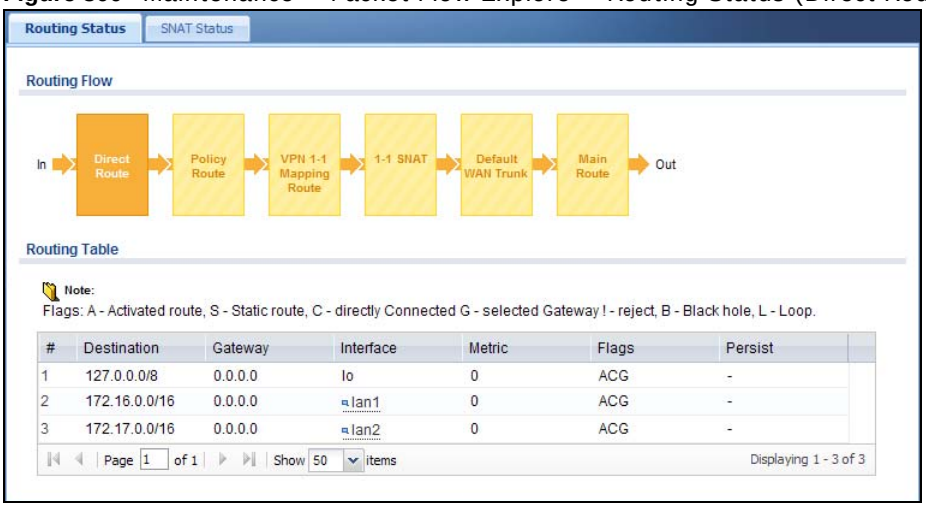


Figure 301 Maintenance > Packet Flow Explore > Routing Status (Policy Route)

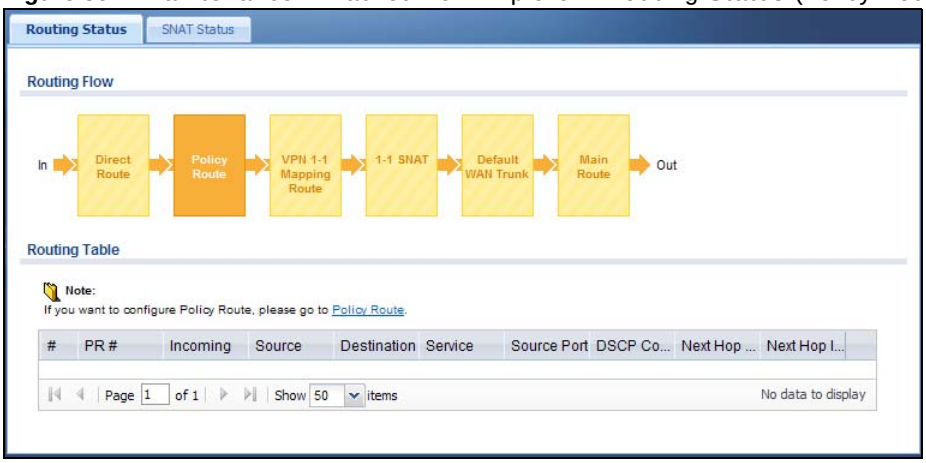


Figure 302 Maintenance > Packet Flow Explore > Routing Status (VPN 1-1 Mapping Route)

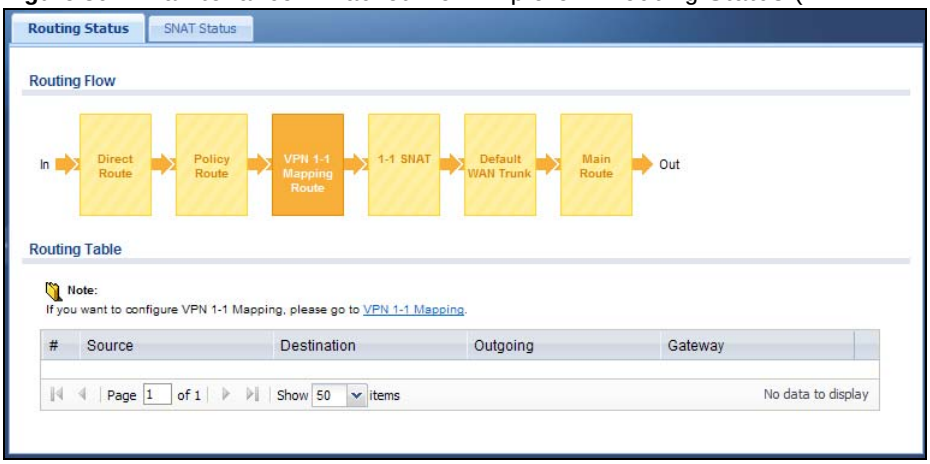


Figure 303 Maintenance > Packet Flow Explore > Routing Status (1-1 SNAT)

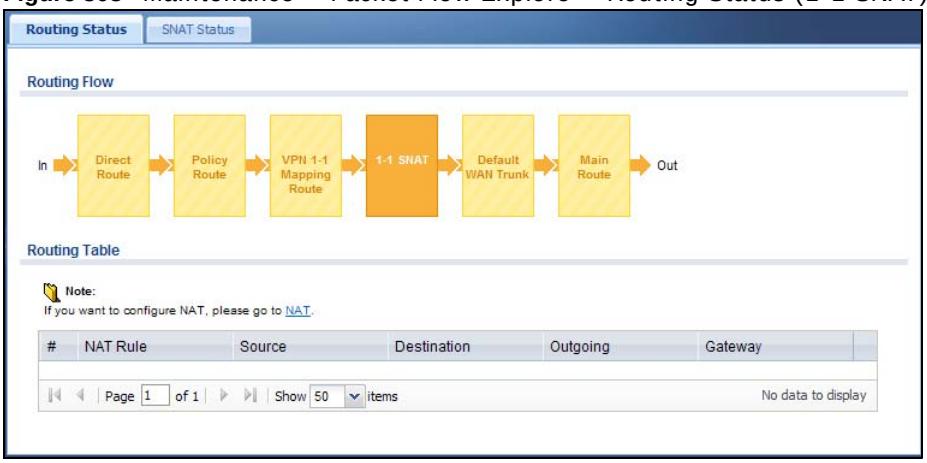


Figure 304 Maintenance > Packet Flow Explore > Routing Status (Default WAN Trunk)

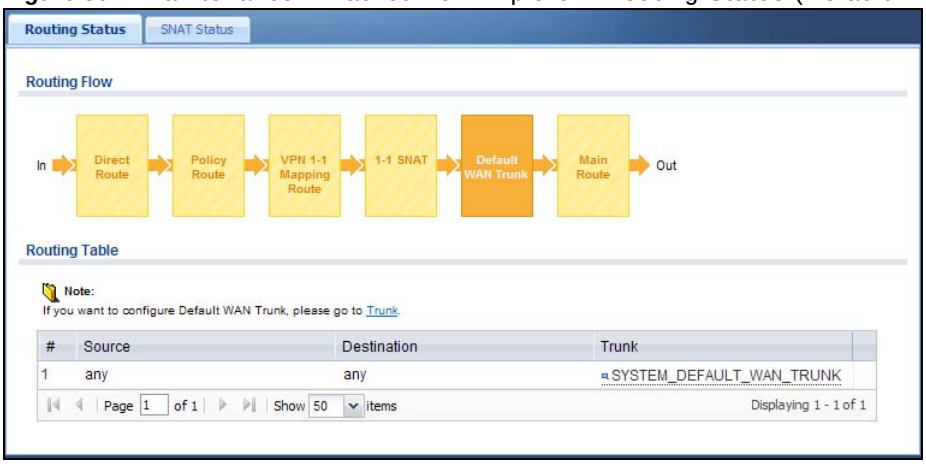
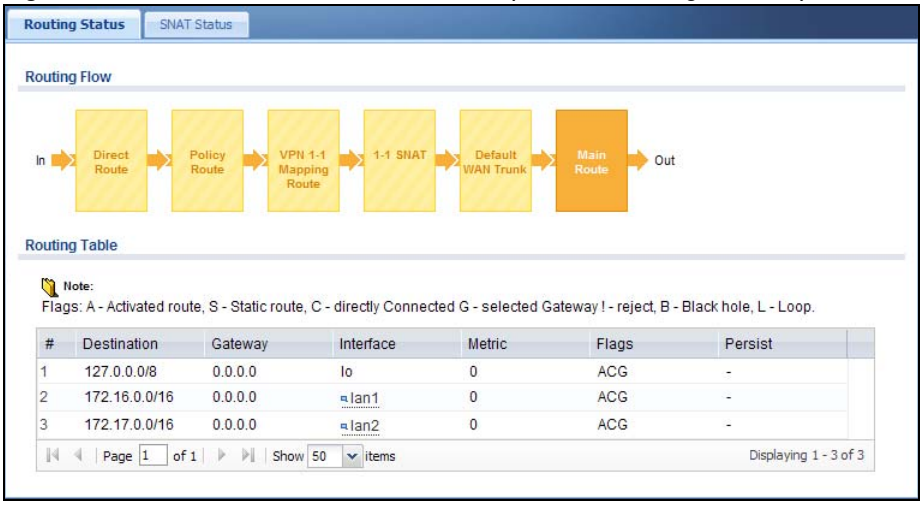


Figure 305 Maintenance > Packet Flow Explore > Routing Status (Main Route)



The following table describes the labels in this screen.

Table 213 Maintenance > Packet Flow Explore > Routing Status

LABEL	DESCRIPTION
Routing Flow	This section shows you the flow of how the UAG determines where to route a packet. Click a function box to display the related settings in the **Routing Table** section.
Routing Table	This section shows the corresponding settings according to the function box you click in the **Routing Flow** section.
The following fields are available if you click **Direct Route** or **Main Route** in the **Routing Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
Destination	This is the destination IP address of a route.
Gateway	This is the IP address of the next-hop gateway or the interface through which the traffic is routed.
Interface	This is the name of an interface associated with the route.
Metric	This is the route's priority among the displayed routes.
Flags	This indicates additional information for the route. The possible flags are: • **A** - this route is currently activated. • **S** - this is a static route. • **C** - this is a direct connected route. • **G** - the route is to a gateway (router) in the same network. • **!** - this is a route which forces a route lookup to fail. • **B** - this is a route which discards packets. • **L** - this is a recursive route.
Persist	This is the remaining time of a dynamically learned route. The UAG removes the route after this time period is counted down to zero.
The following fields are available if you click **Policy Route** in the **Routing Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
PR #	This is the number of an activated policy route. If you have configured a schedule for the route, this screen only displays the route at the scheduled time.
Incoming	This is the interface on which the packets are received.
Source	This is the source IP address(es) from which the packets are sent.
Destination	This is the destination IP address(es) to which the packets are transmitted.
Service	This is the name of the service object. **any** means all services.
Source Port	This is the name of a service object. The UAG applies the policy route to the packets sent from the corresponding service port. **any** means all service ports.
DSCP Code	This is the DSCP value of incoming packets to which this policy route applies. See Section 11.2 on page 147 for more information.
Next Hop Type	This is the type of the next hop to which packets are directed.
Next Hop Info	• This is the main route if the next hop type is **Auto**. • This is the interface name and gateway IP address if the next hop type is **Interface / GW**. • This is the trunk name if the next hop type is **Trunk**.
The following fields are available if you click **VPN 1-1 Mapping Route** in the **Routing Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
Source	This is the original source IP address(es). **any** means any IP address.
Destination	This is the original destination IP address(es). **any** means any IP address.
Outgoing	This is the name of an interface which transmits packets out of the UAG.
Gateway	This is the IP address of the gateway in the same network of the outgoing interface.

Table 213 Maintenance > Packet Flow Explore > Routing Status (continued)

LABEL	DESCRIPTION
The following fields are available if you click **1-1 SNAT** in the **Routing Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
NAT Rule	This is the name of an activated 1:1 or Many 1:1 NAT rule in the NAT table.
Source	This is the original source IP address(es). **any** means any IP address.
Destination	This is the original destination IP address(es). **any** means any IP address.
Outgoing	This is the name of an interface which transmits packets out of the UAG.
Gateway	This is the IP address of the gateway in the same network of the outgoing interface.
The following fields are available if you click **Default WAN Trunk** in the **Routing Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
Source	This is the source IP address(es) from which the packets are sent. **any** means any IP address.
Destination	This is the destination IP address(es) to which the packets are transmitted. **any** means any IP address.
Trunk	This is the name of the WAN trunk through which the matched packets are transmitted.

43.3 The SNAT Status Screen

The **SNAT Status** screen allows you to view and quickly link to specific source NAT (SNAT) settings. Click a function box in the **SNAT Flow** section, the related SNAT rules (activated) will display in the **SNAT Table** section. To access this screen, click **Maintenance** > **Packet Flow Explore** > **SNAT Status**.

The order of the SNAT flow may vary depending on whether you:

- select **use default SNAT** in the **Configuration > Network > Interface > Trunk** screen.
- use policy routes to control 1-1 NAT by using the `policy control-virtual-server-rules activate` command.

Note: Once a packet matches the criteria of an SNAT rule, the UAG takes the corresponding action and does not perform any further flow checking.

Figure 306 Maintenance > Packet Flow Explore > SNAT Status (Policy Route SNAT)

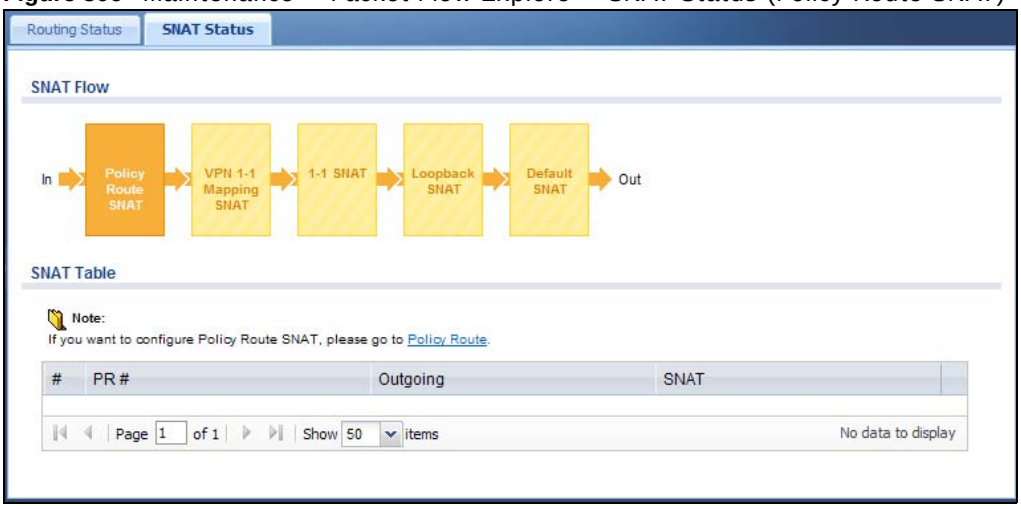


Figure 307 Maintenance > Packet Flow Explore > SNAT Status (VPN 1-1 Mapping Route)

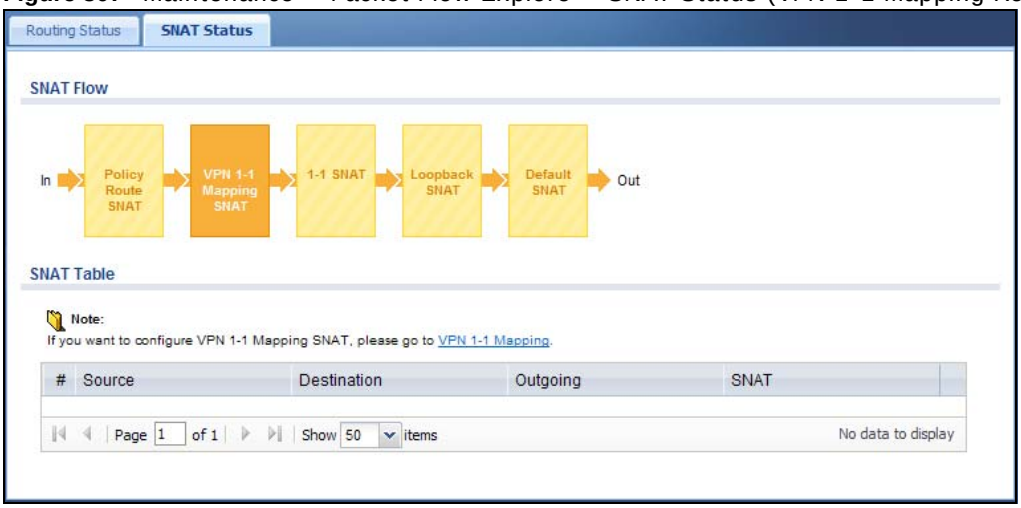


Figure 308 Maintenance > Packet Flow Explore > SNAT Status (1-1 SNAT)

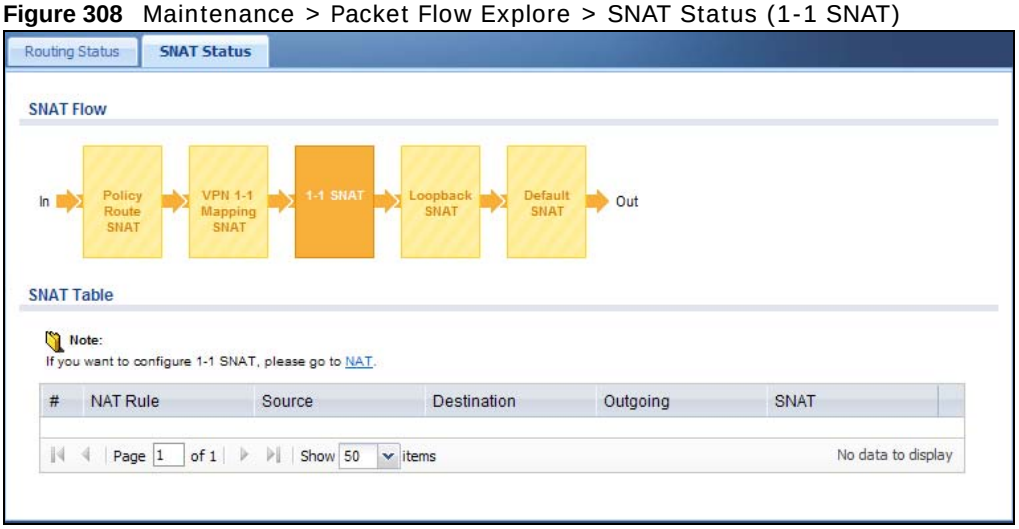


Figure 309 Maintenance > Packet Flow Explore > SNAT Status (Loopback SNAT)

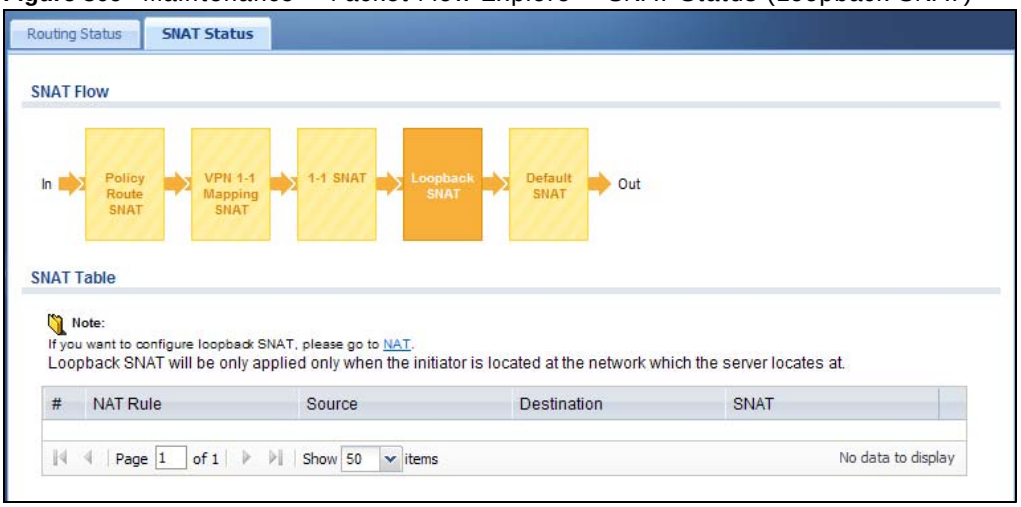
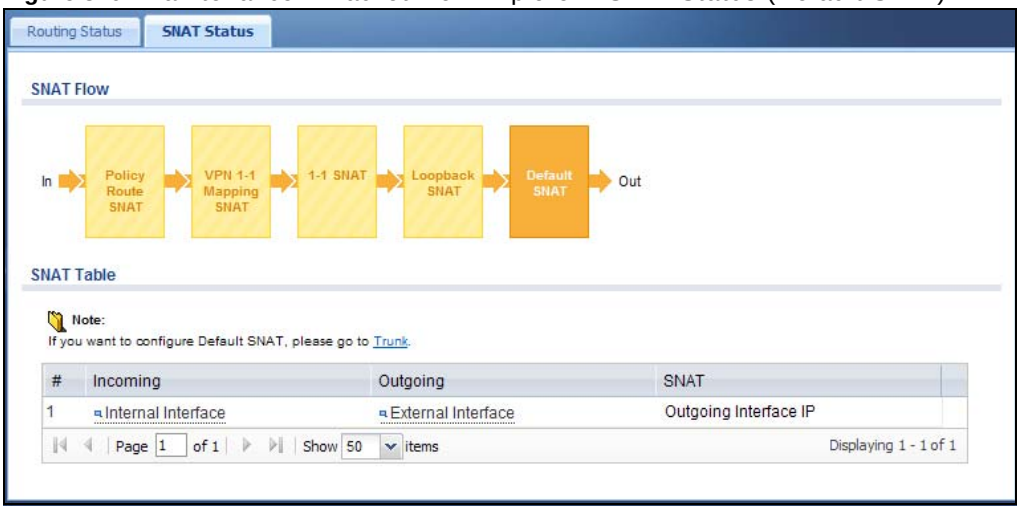


Figure 310 Maintenance > Packet Flow Explore > SNAT Status (Default SNAT)



The following table describes the labels in this screen.

Table 214 Maintenance > Packet Flow Explore > SNAT Status

LABEL	DESCRIPTION
SNAT Flow	This section shows you the flow of how the UAG changes the source IP address for a packet according to the rules you have configured in the UAG. Click a function box to display the related settings in the **SNAT Table** section.
SNAT Table	The table fields in this section vary depending on the function box you select in the **SNAT Flow** section.
The following fields are available if you click **Policy Route SNAT** in the **SNAT Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
PR #	This is the number of an activated policy route which uses SNAT.
Outgoing	This is the outgoing interface that the route uses to transmit packets.
SNAT	This is the source IP address(es) that the SNAT rule uses finally.
The following fields are available if you click **VPN 1-1 Mapping SNAT** in the **SNAT Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
Source	This is the original source IP address(es).

Table 214 Maintenance > Packet Flow Explore > SNAT Status (continued)

LABEL	DESCRIPTION
Destination	This is the original destination IP address(es).
Outgoing	This is the outgoing interface that the SNAT rule uses to transmit packets.
SNAT	This is the source IP address(es) that the SNAT rule uses finally.
The following fields are available if you click **1-1 SNAT** in the **SNAT Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
NAT Rule	This is the name of an activated NAT rule which uses SNAT.
Source	This is the original source IP address(es).
Destination	This is the original destination IP address(es).
Outgoing	This is the outgoing interface that the SNAT rule uses to transmit packets.
SNAT	This is the source IP address(es) that the SNAT rule uses finally.
The following fields are available if you click **Loopback SNAT** in the **SNAT Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
NAT Rule	This is the name of an activated NAT rule which uses SNAT and enables NAT loopback.
Source	This is the original source IP address(es). **any** means any IP address.
Destination	This is the original destination IP address(es). **any** means any IP address.
SNAT	This indicates which source IP address the SNAT rule uses finally. For example, **Outgoing Interface IP** means that the UAG uses the IP address of the outgoing interface as the source IP address for the matched packets it sends out through this rule.
The following fields are available if you click **Default SNAT** in the **SNAT Flow** section.	
#	This field is a sequential value, and it is not associated with any entry.
Incoming	This indicates internal interface(s) on which the packets are received.
Outgoing	This indicates external interface(s) from which the packets are transmitted.
SNAT	This indicates which source IP address the SNAT rule uses finally. For example, **Outgoing Interface IP** means that the UAG uses the IP address of the outgoing interface as the source IP address for the matched packets it sends out through this rule.

44

Reboot

44.1 Overview

Use this to restart the device (for example, if the device begins behaving erratically). See also Section 1.5 on page 30 for information on different ways to start and stop the UAG.

44.1.1 What You Need To Know

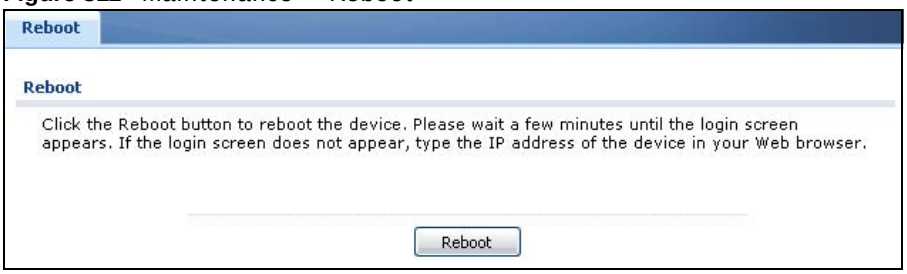
If you applied changes in the Web configurator, these were saved automatically and do not change when you reboot. If you made changes in the CLI, however, you have to use the `write` command to save the configuration before you reboot. Otherwise, the changes are lost when you reboot.

Reboot is different to reset; (see Section 46.1 on page 435) reset returns the device to its default configuration.

44.2 The Reboot Screen

The **Reboot** screen allows remote users to restart the device. To access this screen, click **Maintenance** > **Reboot**.

Figure 311 Maintenance > Reboot



Click the **Reboot** button to restart the UAG. Wait a few minutes until the login screen appears. If the login screen does not appear, type the IP address of the device in your Web browser.

You can also use the CLI command `reboot` to restart the UAG.

45

Shutdown

45.1 Overview

Use this to shutdown the device in preparation for disconnecting the power. See also Section 1.5 on page 30 for information on different ways to start and stop the UAG.

Always use the Maintenance > Shutdown > Shutdown screen or the "shutdown" command before you turn off the UAG or remove the power. Not doing so can cause the firmware to become corrupt.

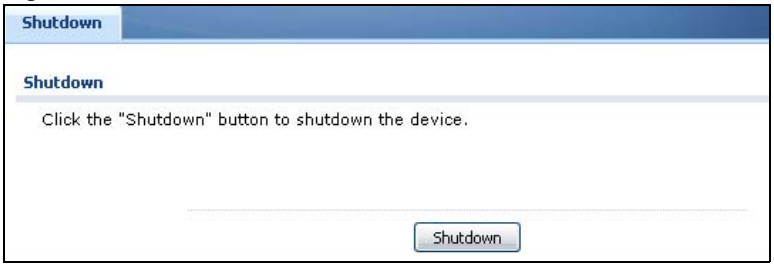
45.1.1 What You Need To Know

Shutdown writes all cached data to the local storage and stops the system processes.

45.2 The Shutdown Screen

To access this screen, click **Maintenance** > **Shutdown**.

Figure 312 Maintenance > Shutdown



Click the **Shutdown** button to shut down the UAG. Wait for the device to shut down before you manually turn off or remove the power. It does not turn off the power.

You can also use the CLI command shutdown to shutdown the UAG.

46

Troubleshooting

This chapter offers some suggestions to solve problems you might encounter.

- You can also refer to the logs (see Chapter 6 on page 83).
- For the order in which the UAG applies its features and checks, see Chapter 43 on page 419.

None of the LEDs turn on.

Make sure that you have the power cord connected to the UAG and plugged in to an appropriate power source. Make sure you have the UAG turned on. Check all cable connections.

If the LEDs still do not turn on, you may have a hardware problem. In this case, you should contact your local vendor.

Cannot access the UAG from the LAN.

- Check the cable connection between the UAG and your computer or switch.
- Ping the UAG from a LAN computer. Make sure your computer's Ethernet card is installed and functioning properly. Also make sure that its IP address is in the same subnet as the UAG's.
- In the computer, click **Start**, **(All) Programs**, **Accessories** and then **Command Prompt**. In the **Command Prompt** window, type "ping" followed by the UAG's LAN IP address (172.16.0.1 or 172.17.0.1 is the default) and then press [ENTER]. The UAG should reply.
- If you've forgotten the UAG's password, use the **RESET** button. Press the button in for about 5 seconds (or until the **PWR** LED starts to blink), then release it. It returns the UAG to the factory defaults (password is 1234, LAN IP address 172.16.0.1 or 172.17.0.1 etc.; see your User's Guide for details).
- If you've forgotten the UAG's IP address, you can use the commands through the console port to check it. Connect your computer to the **CONSOLE** port using a console cable. Your computer should have a terminal emulation communications program (such as HyperTerminal) set to VT100 terminal emulation, no parity, 8 data bits, 1 stop bit, no flow control and 115200 bps port speed.

I cannot access the Internet.

- Check the UAG's connection to the Ethernet jack with Internet access. Make sure the Internet gateway device (such as a DSL modem) is working properly.

- Check the WAN interface's status in the **Dashboard**. Use the installation setup wizard again and make sure that you enter the correct settings. Use the same case as provided by your ISP.

I configured security settings but the UAG is not applying them for certain interfaces.

Many security settings are usually applied to zones. Make sure you assign the interfaces to the appropriate zones. When you create an interface, there is no security applied on it until you assign it to a zone.

The UAG is not applying the custom policy route I configured.

The UAG checks the policy routes in the order that they are listed. So make sure that your custom policy route comes before any other routes that the traffic would also match.

The UAG is not applying the custom firewall rule I configured.

The UAG checks the firewall rules in the order that they are listed. So make sure that your custom firewall rule comes before any other rules that the traffic would also match.

I cannot enter the interface name I want.

- The format of interface names other than the Ethernet interface names is very strict. Each name consists of 2-4 letters (interface type), followed by a number (x, limited by the maximum number of each type of interface). For example, VLAN interfaces are vlan0, vlan1, vlan2, ...; and so on.
- The names of virtual interfaces are derived from the interfaces on which they are created. For example, virtual interfaces created on Ethernet interface wan1 are called wan1:1, wan1:2, and so on. Virtual interfaces created on VLAN interface vlan2 are called vlan2:1, vlan2:2, and so on. You cannot specify the number after the colon(:) in the Web Configurator; it is a sequential number. You can specify the number after the colon if you use the CLI to set up a virtual interface.

I cannot set up a PPP interface, virtual Ethernet interface or virtual VLAN interface on an Ethernet interface.

You cannot set up a PPP interface, virtual Ethernet interface or virtual VLAN interface if the underlying interface is a member of a bridge. You also cannot add an Ethernet interface or VLAN interface to a bridge if the member interface has a virtual interface or PPP interface on top of it.

My rules and settings that apply to a particular interface no longer work.

The interface's IP address may have changed. To avoid this create an IP address object based on the interface. This way the UAG automatically updates every rule or setting that uses the object whenever the interface's IP address settings change. For example, if you change LAN1's IP address, the UAG automatically updates the corresponding interface-based, LAN1 subnet address object.

I cannot set up a PPP interface.

You have to set up an ISP account before you create a PPPoE or PPTP interface.

I cannot configure a particular VLAN interface on top of an Ethernet interface even though I have it configured it on top of another Ethernet interface.

Each VLAN interface is created on top of only one Ethernet interface.

The UAG is not applying an interface's configured ingress bandwidth limit.

At the time of writing, the UAG does not support ingress bandwidth management.

The UAG routes and applies SNAT for traffic from some interfaces but not from others.

The UAG automatically uses SNAT for traffic it routes from internal interfaces to external interfaces. For example LAN to WAN traffic. You must manually configure a policy route to add routing and SNAT settings for an interface with the **Interface Type** set to **General**. You can also configure a policy route to override the default routing and SNAT behavior for an interface with the **Interface Type** set to **Internal** or **External**.

I cannot get Dynamic DNS to work.

- You must have a public WAN IP address to use Dynamic DNS.
- Make sure you recorded your DDNS account's user name, password, and domain name and have entered them properly in the UAG.
- You may need to configure the DDNS entry's IP Address setting to **Auto** if the interface has a dynamic IP address or there are one or more NAT routers between the UAG and the DDNS server.

- The UAG may not determine the proper IP address if there is an HTTP proxy server between the UAG and the DDNS server.

I cannot create a second HTTP redirect rule for an incoming interface.

You can configure up to one HTTP redirect rule for each (incoming) interface.

The UAG keeps resetting the connection.

If an alternate gateway on the LAN has an IP address in the same subnet as the UAG's LAN IP address, return traffic may not go through the UAG. This is called an asymmetrical or "triangle" route. This causes the UAG to reset the connection, as the connection has not been acknowledged.

You can set the UAG's firewall to permit the use of asymmetrical route topology on the network (so it does not reset the connection) although this is not recommended since allowing asymmetrical routes may let traffic from the WAN go directly to the LAN without passing through the UAG. A better solution is to use virtual interfaces to put the UAG and the backup gateway on separate subnets. See Asymmetrical Routes on page 225 and the chapter about interfaces for more information.

I changed the LAN IP address and can no longer access the Internet.

The UAG automatically updates address objects based on an interface's IP address, subnet, or gateway if the interface's IP address settings change. However, you need to manually edit any address objects for your LAN that are not based on the interface.

I cannot get the RADIUS server to authenticate the UAG's default admin account.

The default **admin** account is always authenticated locally, regardless of the authentication method setting. (See Chapter 35 on page 318 for more information about authentication methods.)

The UAG fails to authentication the ext-user user accounts I configured.

An external server such as RADIUS must authenticate the ext-user accounts. If the UAG tries to use the local database to authenticate an **ext-user**, the authentication attempt will always fail. (This is related to AAA servers and authentication methods, which are discussed in Chapter 35 on page 318 and Chapter 36 on page 322, respectively.)

I cannot add the admin users to a user group with access users.

You cannot put access users and admin users in the same user group.

I cannot add the default admin account to a user group.

You cannot put the default **admin** account into any user group.

The schedule I configured is not being applied at the configured times.

Make sure the UAG's current date and time are correct.

I cannot get a certificate to import into the UAG.

1. For **My Certificates**, you can import a certificate that matches a corresponding certification request that was generated by the UAG. You can also import a certificate in PKCS#12 format, including the certificate's public and private keys.
2. You must remove any spaces from the certificate's filename before you can import the certificate.
3. Any certificate that you want to import has to be in one of these file formats:
   - Binary X.509: This is an ITU-T recommendation that defines the formats for X.509 certificates.
   - PEM (Base-64) encoded X.509: This Privacy Enhanced Mail format uses lowercase letters, uppercase letters and numerals to convert a binary X.509 certificate into a printable form.
   - Binary PKCS#7: This is a standard that defines the general syntax for data (including digital signatures) that may be encrypted. A PKCS #7 file is used to transfer a public key certificate. The private key is not included. The UAG currently allows the importation of a PKS#7 file that contains a single certificate.
   - PEM (Base-64) encoded PKCS#7: This Privacy Enhanced Mail (PEM) format uses lowercase letters, uppercase letters and numerals to convert a binary PKCS#7 certificate into a printable form.
   - Binary PKCS#12: This is a format for transferring public key and private key certificates.The private key in a PKCS #12 file is within a password-encrypted envelope. The file's password is not connected to your certificate's public or private passwords. Exporting a PKCS #12 file creates this and you must provide it to decrypt the contents when you import the file into the UAG.

   Note: Be careful not to convert a binary file to text during the transfer process. It is easy for this to occur since many programs use text files by default.

I cannot access the UAG from a computer connected to the Internet.

Check the service control rules and to-UAG firewall rules.

I uploaded a logo to display on the upper left corner of the Web Configurator login screen and access page but it does not display properly.

Make sure the logo file is a GIF, JPG, or PNG of 100 kilobytes or less.

I uploaded a logo to use as the screen or window background but it does not display properly.

Make sure the logo file is a GIF, JPG, or PNG of 100 kilobytes or less.

The UAG's traffic throughput rate decreased after I started collecting traffic statistics.

Data collection may decrease the UAG's traffic throughput rate.

I can only see newer logs. Older logs are missing.

When a log reaches the maximum number of log messages, new log messages automatically overwrite existing log messages, starting with the oldest existing log message first.

The commands in my configuration file or shell script are not working properly.

- In a configuration file or shell script, use "#" or "!" as the first character of a command line to have the UAG treat the line as a comment.
- Your configuration files or shell scripts can use "exit" or a command line consisting of a single "!" to have the UAG exit sub command mode.
- Include `write` commands in your scripts. Otherwise the changes will be lost when the UAG restarts. You could use multiple `write` commands in a long script.

Note: "exit" or "!'" must follow sub commands if it is to make the UAG exit sub command mode.

See Chapter 41 on page 400 for more on configuration files and shell scripts.

I cannot get the firmware uploaded using the commands.

The Web Configurator is the recommended method for uploading firmware. You only need to use the command line interface if you need to recover the firmware. See the CLI Reference Guide for how to determine if you need to recover the firmware and how to recover it.

My packet capture captured less than I wanted or failed.

The packet capture screen's **File Size** sets a maximum size limit for the total combined size of all the capture files on the UAG, including any existing capture files and any new capture files you generate. If you have existing capture files you may need to set this size larger or delete existing capture files.

The UAG stops the capture and generates the capture file when either the capture files reach the **File Size** or the time period specified in the **Duration** field expires.

My earlier packet capture files are missing.

New capture files overwrite existing files of the same name. Change the **File Suffix** field's setting to avoid this.

46.1 Resetting the UAG

If you cannot access the UAG by any method, try restarting it by turning the power off and then on again. If you still cannot access the UAG by any method or you forget the administrator password(s), you can reset the UAG to its factory-default settings. Any configuration files or shell scripts that you saved on the UAG should still be available afterwards.

Use the following procedure to reset the UAG to its factory-default settings. This overwrites the settings in the startup-config.conf file with the settings in the system-default.conf file.

Note: This procedure removes the current configuration.

If you want to reboot the device without changing the current configuration, see Chapter 44 on page 427.

1. Make sure the **SYS** LED is on and not blinking.
2. Press the **RESET** button and hold it until the **SYS** LED begins to blink. (This usually takes about five seconds.)
3. Release the **RESET** button, and wait for the UAG to restart.

You should be able to access the UAG using the default settings.

46.2 Getting More Troubleshooting Help

Search for support information for your model at www.zyxel.com for more troubleshooting suggestions.

A

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Certifications

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This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operations.

FCC Warning

This device has been tested and found to comply with the limits for a Class A digital switch, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese BSMI (Bureau of Standards, Metrology and Inspection) A Warning:

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這是甲類的資訊產品，在居住的環境使用時，

可能造成射頻干擾，在這種情況下，

使用者會被要求採取某些適當的對策.

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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Safety Warnings

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Do NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel should service or disassemble this device. Please contact your vendor for further information.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY an appropriate power adaptor or cord for your device. Connect it to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe).
- Do NOT remove the plug and connect it to a power outlet by itself; always attach the plug to the power adaptor first before connecting it to a power outlet.
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the device and the power source.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- CAUTION: RISK OF EXPLOSION IF BATTERY (on the motherboard) IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS. Dispose them at the applicable collection point for the recycling of electrical and electronic equipment. For detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the store where you purchased the product.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.

Your product is marked with this symbol, which is known as the WEEE mark. WEEE stands for Waste Electronics and Electrical Equipment. It means that used electrical and electronic products should not be mixed with general waste. Used electrical and electronic equipment should be treated separately.

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Ai sensi dell'art. 13 del Decreto Legislativo 25 luglio 2005, n.151"Attuazione delle Direttive 2002/95/CE, 2002/96/CE e 2003/108/CE, relative alla riduzione dell'uso di sostanze pericolose nelle apparecchiature elettriche ed elettroniche, nonche allo smaltimento dei rifiuti"

Il simbolo del cassonetto barrato riportato sull'apparecchiatura o sulla sua confezione indica che il prodotto alla fine della propria vita utile deve essere raccolto separatamente dagli altri rifiuti.

La raccolta differenziata della presente apparecchiatura giunta a fine vita e organizzata e gestita dal produttore. L'utente che vorra disfarsi della presente apparecchiatura dovra quindi contattare il produttore e seguire il sistema che questo ha adottato per consentire la raccolta separata dell'apparecchiatura giunta a fine vita.

L'adeguata raccolta differenziata per l'avvio successivo dell'apparecchiatura dismessa al riciclaggio, al trattamento e allo smaltimento ambientalmente compatibile contribuisce ad evitare possibili effetti negativi sull'ambiente e sulla salute e favorisce il reimpiego e/o riciclo dei materiali di cui e composta l'apparecchiatura.

Lo smaltimento abusivo del prodotto da parte del detentore comporta l'applicazione delle sanzioni amministrative previste dalla normativa vigente."

RoHS

ENGLISH	DEUTSCH	ESPAÑOL	FRANÇAIS
Green Product Declaration	**Grünes Produkt Erklärung**	**Declaración de Producto Ecológico**	**Déclaration de Produit Vert**
RoHS Directive 2011/65/EU	RoHS Richtlinie 2011/65/EU	Directiva RoHS 2011/65/UE	Directive RoHS 2011/65/UE
WEEE Directive 2002/96/EC (WEEE: Waste Electrical and Electronic Equipment) 2003/108/EC;2008/34/EC	ElektroG Richtlinie 2002/96/EG (ElektroG: Über Elektro- und Elektronik-Altgeräte) 2003/108/EG;2008/34/EG	Directiva RAEE 2002/96/CE (RAEE : Residuos de Aparatos Eléctricos y Electrónicos) 2003/108/CE;2008/34/CE	Directive DEEE 2002/96/CE (DEEE : déchets d'équipements électriques et électroniques) 2003/108/CE;2008/34/CE
Declaration Signature: Name/Title: Raymond Huang / Quality & Customer Service Division/ Assistant VP. Date (yyyy/mm/dd): 2013/02/01	Unterschrift des Erklärenden: Name/Title: Raymond Huang / Quality & Customer Service Division / Assistant VP. Date (yyyy/mm/dd): 2013/02/01	Firma de declaración: Nombre/Titulo: Raymond Huang / Quality & Customer Service Division / Assistant VP. Fecha (aaaa/mm/dd): 2013/02/01	Signature de la déclaration : Nom/Titre : Raymond Huang / Quality & Customer Service Division / Assistant VP. Date (aaaa/mm/jj) : 2013/02/01

ITALIANO	NEDERLANDS	SVENSKA
Prodotto dichiarazione di verde	**Productmilieuverklaring**	**Miljödeklaration**
Direttiva RoHS 2011/65/UE	RoHS Richtlijn 2011/65/EU	RoHS Direktiv 2011/65/EU
Direttiva RAEE 2002/96/CE (RAEE: Rifiuti di Apparecchiature Elettriche ed Elettroniche) 2003/108/CE;2008/34/CE	AEEA-Richtlijn 2002/96/EG (AEEA: Afgedankte Elektrische en Elektronische apparatuur) 2003/108/EG;2008/34/EG	WEEE Direktiv 2002/96/EG (WEEE: om avfall som utgörs av eller innehåller elektriska eller elektroniska produkter) 2003/108/EG;2008/34/EG
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Index

Symbols

Numbers

3322 Dynamic DNS 159

A

AAA
  port 320
AAA server 318
  and users 276
  local user database 318
  RADIUS 318, 319
  RADIUS group 319
  see also RADIUS
access 19
access users 275, 277
  custom page 362
  forcing login 205
  idle timeout 284
  logging in 205
  multiple logins 284
  see also users 275
  Web Configurator 286
access users, see also force user authentication policies
account
  user 275
accounting server 318
active sessions 53, 55, 66
address groups 304
  and firewall 212
  and FTP 380
  and SNMP 383
  and SSH 376
  and Telnet 379
  and WWW 362
address objects 304
  and firewall 212
  and FTP 380
  and NAT 152, 167
  and policy routes 151
  and SNMP 383
  and SSH 376
  and Telnet 379
  and WWW 362
  HOST 304
  RANGE 304
  SUBNET 304
  types of 304
address record 353
admin user
  troubleshooting 433
admin users 275
  multiple logins 284
  see also users 275
AF 154
alerts 391, 392, 394, 396, 397, 398
ALG 184
  and firewall 184
  and NAT 184
  and policy routes 184
  and trunks 184
  FTP 184
  H.323 184
  see also VoIP pass through 184
  SIP 184
Application Layer Gateway, see ALG
application patrol
  vs firewall 223
asymmetrical routes 225
  allowing through the firewall 227
  vs virtual interfaces 225
authentication
  server 318
authentication method objects 322
  and users 276
  and WWW 361

create 323
authentication policy
exceptional services 210
authentication type 46, 343
Authentication, Authorization, Accounting servers, see AAA server
authorization server 318

B

backing up configuration files 402
bandwidth limit
troubleshooting 431
bandwidth management 265
maximize bandwidth usage 269
boot module 407
bridge interfaces 98, 125
and virtual interfaces of members 126
basic characteristics 98
effect on routing table 125
member interfaces 125
virtual 131
bridges 124

C

CA
and certificates 326
CA (Certificate Authority), see certificates
capturing packets 413
CEF (Common Event Format) 388, 396
certificate
troubleshooting 433
Certificate Authority (CA)
see certificates
Certificate Revocation List (CRL) 326
certificates 325
advantages of 326
and CA 326
and FTP 380
and HTTPS 358
and SSH 376
and WWW 360
certification path 326, 332, 338
expired 326
factory-default 326
file formats 326
fingerprints 333, 339
importing 329
not used for encryption 326
revoked 326
self-signed 326, 331
serial number 333, 338
storage space 328, 335
thumbprint algorithms 327
thumbprints 327
used for authentication 326
verifying fingerprints 327
certification requests 331
certifications 437
notices 437
viewing 437
Challenge Handshake Authentication Protocol (CHAP) 343
CHAP (Challenge Handshake Authentication Protocol) 343
CHAP/PAP 343
CLI 19, 22
button 22
messages 22
popup window 22
Reference Guide 2
commands 19
sent by Web Configurator 22
Common Event Format (CEF) 388, 396
compression (stac) 343
computer names 107, 123, 130, 135
configuration
information 411, 416
configuration file
troubleshooting 434
configuration files 400
at restart 403
backing up 402
downloading 404
downloading with FTP 379
editing 400
how applied 401
lastgood.conf 403, 406
managing 402
startup-config.conf 406
startup-config-bad.conf 403

syntax 401
system-default.conf 406
uploading 406
uploading with FTP 379
use without restart 400
connection
troubleshooting 432
connectivity check 106, 116, 122, 130
console port
speed 350
cookies 19
copyright 437
CPU usage 53, 54
current date/time 51, 346
and schedules 314
daylight savings 348
setting manually 349
time server 350
custom
access user page 362
login page 362

D

date 346
daylight savings 348
DDNS 159
backup mail exchanger 163
mail exchanger 163
service providers 159
troubleshooting 431
default
firewall behavior 224
device access
troubleshooting 429
DHCP 134, 345
and DNS servers 135
and domain name 345
and interfaces 135
client list 56
pool 135
static DHCP 135
diagnostics 411, 416
DiffServ 154
Digital Signature Algorithm public-key algorithm, see DSA
direct routes 148
disclaimer 437
DNS 351
address records 353
domain name forwarders 354
domain name to IP address 353
IP address to domain name 353
Mail eXchange (MX) records 355
pointer (PTR) records 353
DNS servers 47, 351, 354
and interfaces 135
documentation
related 2
domain name 345
Domain Name System, see DNS
DSA 331
DSCP 148, 151, 271, 273, 422
Dynamic Domain Name System, see DDNS
dynamic guest 73
dynamic guest account 73, 276
Dynamic Host Configuration Protocol, see DHCP.
DynDNS 159
DynDNS see also DDNS 159
Dynu 159

E

e-mail
daily statistics report 385
encryption
RSA 333
encryption method 343
Ethernet interfaces 98
and routing protocols 101
basic characteristics 98
virtual 131
exceptional services 210
Extended Service Set IDentification 289
ext-user
troubleshooting 432

F

FCC interference statement 437
file extensions
  configuration files 400
  shell scripts 400
file manager 400
Firefox 19
firewall 223
  actions 230
  and address groups 212
  and address objects 212
  and ALG 184
  and HTTP redirect 177
  and logs 212, 230
  and NAT 226
  and schedules 212, 229, 270, 273
  and service groups 229
  and service objects 310
  and services 229
  and SMTP redirect 181
  and user groups 229, 232
  and users 229, 232
  and VPN 1-1 mapping 172
  and zones 223, 227
  asymmetrical routes 225, 227
  global rules 224
  priority 228
  rule criteria 225
  see also to-Device firewall 223
  session limits 225, 230
  to-Device, see to-Device firewall
  triangle routes 225, 227
  troubleshooting 430
  vs application patrol 223
firmware
  and restart 406
  boot module, see boot module
  current version 51, 407
  getting updated 406
  uploading 406, 407
  uploading with FTP 379
firmware upload
  troubleshooting 435
flash usage 53
forcing login 205
FQDN 353
free guest account 259
free time 259
  configuration 259
  enable 259
FTP 379
  additional signaling port 185
  ALG 184
  and address groups 380
  and address objects 380
  and certificates 380
  and zones 380
  signaling port 185
  with Transport Layer Security (TLS) 380
Fully-Qualified Domain Name, see FQDN

G

Generic Routing Encapsulation, see GRE.
GRE 136
Guide
  CLI Reference 2
  Quick Start 2

H

HTTP
  over SSL, see HTTPS
  redirect to HTTPS 360
  vs HTTPS 358
HTTP redirect 176
  and firewall 177
  and interfaces 179
  and policy routes 177
  packet flow 177
  troubleshooting 432
HTTPS 358
  and certificates 358
  authenticating clients 358
  avoiding warning messages 367
  example 366
  vs HTTP 358
  with Internet Explorer 366
  with Netscape Navigator 366
HyperText Transfer Protocol over Secure Socket Layer, see HTTPS

I

ICMP 309
IEEE 802.1q VLAN
IEEE 802.1x 290
interface
  status 52, 63
  troubleshooting 430
interfaces 97
  and DNS servers 135
  and HTTP redirect 179
  and layer-3 virtualization 98
  and NAT 167
  and physical ports 97
  and policy routes 151
  and SMTP redirect 183
  and static routes 153
  and zones 97
  as DHCP relays 135
  as DHCP servers 135, 345
  backup, see trunks
  bandwidth management 134, 142, 144
  bridge, see also bridge interfaces.
  DHCP clients 133
  Ethernet, see also Ethernet interfaces.
  gateway 134
  general characteristics 97
  IP address 133
  metric 134
  MTU 134
  overlapping IP address and subnet mask 133
  port groups, see also port groups.
  PPPoE/PPTP, see also PPPoE/PPTP interfaces.
  prerequisites 99
  relationships between 99
  static DHCP 135
  subnet mask 133
  trunks, see also trunks.
  types 98
  virtual, see also virtual interfaces.
  VLAN, see also VLAN interfaces.
Internet access
  troubleshooting 429, 432
Internet Control Message Protocol, see ICMP
Internet Explorer 19
IP policy routing, see policy routes
IP protocols 309
  and service objects 310
  ICMP, see ICMP
  TCP, see TCP
  UDP, see UDP
IP static routes, see static routes
IP/MAC binding
  example 193
  exempt list 196
  monitor 69
  overview 193
  static DHCP 196
ISP account
  CHAP 343
  CHAP/PAP 343
  MPPE 343
  MSCHAP 343
  MSCHAP-V2 343
  PAP 343
ISP accounts 341
  and PPPoE/PPTP interfaces 111, 341
  authentication type 343
  encryption method 343
  stac compression 343

J

Java
  permissions 19
JavaScripts 19

K

key pairs 325

L

lastgood.conf 403, 406
layer-2 isolation 198
  example 198
  IP 199
LDAP
  and users 276
least load first load balancing 138
LED troubleshooting 429

licensing 90
load balancing 137
algorithms 138, 142, 144
least load first 138
round robin 138
see also trunks 137
session-oriented 138
spillover 139
weighted round robin 139
local user database 318
log
troubleshooting 434
log messages
categories 392, 394, 396, 397, 398
debugging 83
regular 83
types of 83
logged in users 57
login
custom page 362
logo
troubleshooting 434
logout
Web Configurator 20
logs
and firewall 212, 230
e-mail profiles 387
e-mailing log messages 85, 391
formats 388
log consolidation 392
settings 387
syslog servers 387
system 387
types of 387

M

MAC address
and VLAN 117
Ethernet interface 105
range 51
management access
troubleshooting 434
Management Information Base (MIB) 381
memory usage 53, 55
messages
CLI 22
metrics, see reports
Microsoft
Challenge-Handshake Authentication Protocol (MSCHAP) 343
Challenge-Handshake Authentication Protocol Version 2 (MSCHAP-V2) 343
Point-to-Point Encryption (MPPE) 343
model name 51
MPPE (Microsoft Point-to-Point Encryption) 343
MSCHAP (Microsoft Challenge-Handshake Authentication Protocol) 343
MSCHAP-V2 (Microsoft Challenge-Handshake Authentication Protocol Version 2) 343
multicast 295
multicast rate 295
My Certificates, see also certificates 328
myZyXEL.com 90
accounts, creating 90

N

NAS 320
NAS IP 320
NAT 154, 164
ALG, see ALG
and address objects 152
and address objects (HOST) 167
and ALG 184
and firewall 226
and interfaces 167
and policy routes 146, 152
and to-Device firewall 168
loopback 169
port forwarding, see NAT
port translation, see NAT
NAT Port Mapping Protocol 186
NAT Traversal 186
NAT-PMP 186
NBNS 107, 123, 130, 135
NetBIOS
Name Server, see NBNS.
Netscape Navigator 19
Network Access Server 320
Network Address Translation, see NAT

Network Time Protocol (NTP) 349
No-IP 159

O

objects
AAA server 318
addresses and address groups 304
authentication method 322
certificates 325
schedules 314
services and service groups 309
users, user groups 275
other documentation 2

P

packet
statistics 60, 61, 76
packet capture 413
files 412, 415, 417
troubleshooting 435
packet captures
downloading files 412, 416, 417, 418
PAP (Password Authentication Protocol) 343
Password Authentication Protocol (PAP) 343
Peanut Hull 159
physical ports
packet statistics 60, 61, 76
pointer record 353
Point-to-Point Protocol over Ethernet, see PPPoE.
Point-to-Point Tunneling Protocol, see PPTP
policy route
troubleshooting 430
policy routes 145
actions 147
and address objects 151
and ALG 184
and HTTP redirect 177
and interfaces 151
and NAT 146
and schedules 151, 270, 273
and service objects 310
and SMTP redirect 181
and trunks 137, 151
and user groups 150, 151, 270, 273
and users 150, 151, 270, 273
and VPN 1-1 mapping 172
benefits 146
criteria 147
overriding direct routes 148
pop-up windows 19
port forwarding, see NAT
port groups 98, 100
port roles 99
and Ethernet interfaces 99
and physical ports 99
port translation, see NAT
power off 428
PPP 136
troubleshooting 431
PPP interfaces
subnet mask 133
PPPoE 136
and RADIUS 136
TCP port 1723 136
PPPoE/PPTP interfaces 98, 111
and ISP accounts 111, 341
basic characteristics 98
gateway 111
subnet mask 111
PPTP 136
and GRE 136
as VPN 136
pre-subscriber account 277
printer
status 81
printer firmware 252
printer list 252
printer management 252
problems 429
product registration 438
proxy servers 176
web, see web proxy servers
PTR record 353
Public-Key Infrastructure (PKI) 326
public-private key pairs 325

Q

QoS 146, 266
Quick Start Guide 2

R

RADIUS 318, 319
advantages 318
and PPPoE 136
and users 276
port 320
user attributes 287
RADIUS server
troubleshooting 432
reboot 427
vs reset 427
Reference Guide, CLI 2
registration 90
product 438
related documentation 2
Remote Authentication Dial-In User Service, see RADIUS
remote management
FTP, see FTP
see also service control 357
Telnet 378
to-Device firewall 224
WWW, see WWW
reports
collecting data 64
daily 385
daily e-mail 385
specifications 66
traffic statistics 64
reset 435
vs reboot 427
RESET button 435
RFC
1631 (NAT) 154
2131 (DHCP) 134
2132 (DHCP) 134
2516 (PPPoE) 136
2637 (PPTP) 136
2890 (GRE) 136
Rivest, Shamir and Adleman public-key algorithm (RSA) 331
round robin 138
routing
troubleshooting 431
routing protocols
and Ethernet interfaces 101
RSA 331, 333, 338
RSSI threshold 294

S

schedule
troubleshooting 433
schedules 314
and current date/time 314
and firewall 212, 229, 270, 273
and policy routes 151, 270, 273
one-time 314
recurring 314
types of 314
screen resolution 19
Secure Socket Layer, see SSL
security settings
troubleshooting 430
serial number 51
service control 357
and to-Device firewall 357
and users 357
limitations 357
timeouts 357
service groups 310
and firewall 229
service objects 309
and firewall 310
and IP protocols 310
and policy routes 310
Service Set 289
service subscription status 92
services 309
and firewall 229
session limits 225, 230
sessions 66
sessions usage 53, 55
shell script

troubleshooting 434
shell scripts 400
and users 288
downloading 409
editing 408
how applied 401
managing 408
syntax 401
uploading 410
Short Message Service 263
shutdown 428
Simple Network Management Protocol, see SNMP
SMS 263
configuration 263
send account information 263
ViaNett account 263
SMS gateway 263
SMTP redirect
and firewall 181
and interfaces 183
and policy routes 181
packet flow 181
SNAT 154
troubleshooting 431
SNMP 380, 381
agents 381
and address groups 383
and address objects 383
and zones 383
Get 381
GetNext 381
Manager 381
managers 381
MIB 381
network components 381
Set 381
Trap 381
traps 382
versions 380
Source Network Address Translation, see SNAT
spillover (for load balancing) 139
SSH 373
and address groups 376
and address objects 376
and certificates 376
and zones 376
client requirements 375
encryption methods 375
for secure Telnet 376
how connection is established 374
versions 375
with Linux 377
with Microsoft Windows 376
SSL 358
stac compression 343
startup-config.conf 406
if errors 403
missing at restart 403
present at restart 403
startup-config-bad.conf 403
static DHCP 196
static routes 146
and interfaces 153
metric 154
statistics
daily e-mail report 385
traffic 64
status 49
subscription services
status 92
supported browsers 19
syslog 396
syslog servers, see also logs
system log, see logs
system name 51, 345
system reports, see reports
system uptime 51
system-default.conf 406

T

TCP 309
connections 309
port numbers 309
Telnet 378
and address groups 379
and address objects 379
and zones 379
with SSH 376
throughput rate
troubleshooting 434
time 346
time servers (default) 349

to-Device firewall 224
and NAT 168
and remote management 224
and service control 357
global rules 224
see also firewall 223
traffic statistics 64
Transmission Control Protocol, see TCP
Transport Layer Security (TLS) 380
triangle routes 225
allowing through the firewall 227
vs virtual interfaces 225
troubleshooting 411, 416, 429
admin user 433
bandwidth limit 431
certificate 433
configuration file 434
connection resets 432
DDNS 431
device access 429
ext-user 432
firewall 430
firmware upload 435
HTTP redirect 432
interface 430
Internet access 429, 432
LEDs 429
logo 434
logs 434
management access 434
packet capture 435
policy route 430
PPP 431
RADIUS server 432
routing 431
schedules 433
security settings 430
shell scripts 434
SNAT 431
throughput rate 434
VLAN 431
trunks 98, 137
and ALG 184
and policy routes 137, 151
member interface mode 142, 144
member interfaces 142, 144
see also load balancing 137
Trusted Certificates, see also certificates 335

U

UDP 309
messages 309
port numbers 309
Universal Plug and Play 186
Application 186
security issues 187
upgrading
firmware 406
uploading
configuration files 406
firmware 406
shell scripts 408
UPnP 186
usage
CPU 53, 54
flash 53
memory 53, 55
onboard flash 53
sessions 53, 55
USB storage
status 72
user authentication 275
external 276
local user database 318
user awareness 277
User Datagram Protocol, see UDP
user group objects 275
user groups 275, 277
and firewall 229, 232
and policy routes 150, 151, 270, 273
user name
rules 279
user objects 275
user sessions, see sessions
user-aware 212
users 275
access, see also access users
admin (type) 275
admin, see also admin users
and AAA servers 276
and authentication method objects 276
and firewall 229, 232
and LDAP 276
and policy routes 150, 151, 270, 273
and RADIUS 276

and service control 357
and shell scripts 288
attributes for Ext-User 276
attributes for RADIUS 287
attributes in AAA servers 287
currently logged in 51, 57
default lease time 284, 286
default reauthentication time 284, 286
default type for Ext-User 276
ext-group-user (type) 275
Ext-User (type) 276
ext-user (type) 275
groups, see user groups
guest-manager (type) 275
lease time 280
limited-admin (type) 275
lockout 285
reauthentication time 280
types of 275
user names 279

V

Vantage Report (VRPT) 396
virtual interfaces 98, 131
basic characteristics 98
not DHCP clients 133
types of 131
vs asymmetrical routes 225
vs triangle routes 225
Virtual Local Area Network, see VLAN.
VLAN 117
advantages 118
and MAC address 117
ID 117
troubleshooting 431
VLAN interfaces 98, 118
and Ethernet interfaces 118, 431
basic characteristics 98
virtual 131
VoIP pass through
see also ALG 184
VPN 1-1 mapping 171
and firewall 172
and policy routes 172
example 171
introduction 171
packet flow 171
pool profile 174
VRPT (Vantage Report) 396

W

warranty 437
note 438
Web Configurator 18
access 19
access users 286
requirements 19
supported browsers 19
web proxy servers 177
see also HTTP redirect
weighted round robin (for load balancing) 139
WEP (Wired Equivalent Privacy) 290
Wi-Fi Protected Access 290
Windows Internet Naming Service, see WINS
Windows Internet Naming Service, see WINS.
WINS 107, 123, 130, 135
WINS server 107
Wizard Setup 35, 43
WPA 290
WPA2 290
WWW 358
and address groups 362
and address objects 362
and authentication method objects 361
and certificates 360
and zones 362
see also HTTP, HTTPS 358

Z

zones 155
and firewall 223, 227
and FTP 380
and interfaces 155
and SNMP 383
and SSH 376
and Telnet 379
and WWW 362
extra-zone traffic 156

inter-zone traffic 156
intra-zone traffic 156
types of traffic 155